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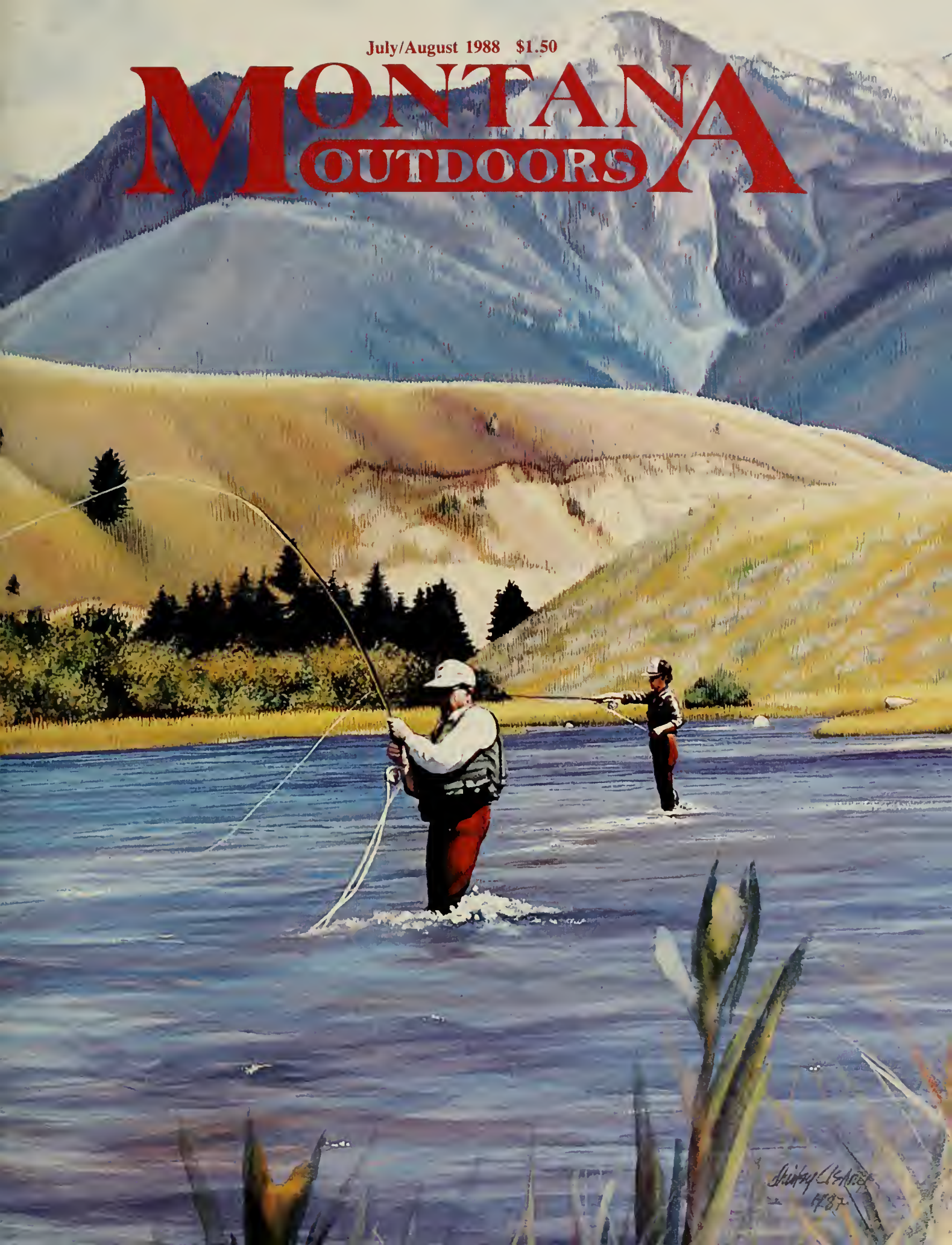
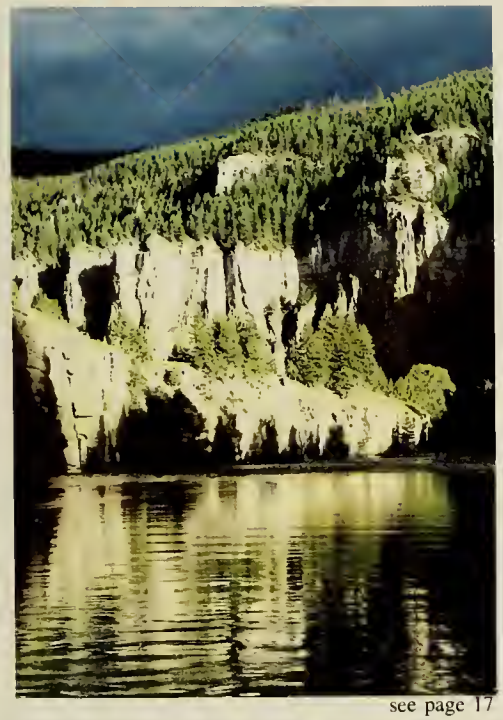
MONTANA OUTDOORS





see page 17

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MONTANA OUTDOORS

July/August 1988
Volume 19, Number 4

FEATURES

2 A Shot for Waterfowl
"Shooting Steel Shot" by Jeff Herbert, and "Reloading Steel Shot" by Tom Hinz

8 Perspectives—"Sounds"
story and photos by Mike Logan
The sounds of a Southeast Kansas boyhood are different from those recognized by boys growing up in Montana.

10 Habitat for the Future
by Bill Phippen, illustrated by Robert Spannring
Passaage of a hallmark bill by the 1987 Montana Legislature translates into habitat for elk, deer, bighorn sheep, and many other wildlife species.

17 Here's to the Rivers!
edited by Sally Hilander
Part Two of a drainage-by-drainage assessment of the natural resource values of Montana's streams and rivers.

37 "Hobnail" Tom
by Michael Korn
Tom Edwards began packing dudes and their gear into the Lincoln backcountry in 1947.

42 Muskrat for Mascot
by Mark Bennett
Forget the Eagles, Lions, and Bears. When it comes to coping with natural and manmade changes in its environment, the muskrat is an all-star, and it's worthy of being selected as any school's mascot.

44 Festival!
by Ron Marcoux
The life, transformation, death, and rebirth of the salmonfly is an annual festival of beauty and expectation.

46 Landowners and Sportsmen: Toward a Partnership
by Rich Clough, illustrated by Lavon Horne
By establishing landowner/sportsman committees, a hunter management program, walk-in-only areas, and other programs, the Department of Fish, Wildlife and Parks has helped to improve relations between landowners and recreationists.

DEPARTMENTS

13 The Catchall
14 Nongame News
16 Contributors
33 Readers Respond
36 Book Review

COVERS

Looking at Shirley Cleary's depictions of Montana's rivers makes you want to toast them as well as her considerable ability to re-create them. Our front cover is another of her fine renditions of the Montana fishing scene, this one on the Madison. Beginning in fall of 1988, steel shot will be required for waterfowl hunting in Montana. Mallards, such as those photographed for our inside front cover by Michael Paul Javorka, will benefit, since use of steel will curtail losses of waterfowl to lead poisoning. Further evidence of Montana's fishing splendor is provided by Christopher Cauble's back cover shot of his wife, Linda, holding a Yellowstone cutthroat trout she caught in Slough Creek in the Absaroka-Beartooth Wilderness Area.

A SHOT FOR WATERFOWL

Beginning in the fall of 1988, steel shot will be required for waterfowl hunting throughout Montana. Hunters who learn the facts about steel shot and develop the skills to use it should have no trouble bagging birds. But even more important, they can enjoy their sport knowing they are not contributing to the continued loss of waterfowl to lead poisoning.

SHOOTING STEEL SHOT

by Jeff Herbert

Over the past several years, much discussion among waterfowl hunters and those responsible for managing our waterfowl resources has centered on the problem of lead poisoning in waterfowl and the use of steel shot as a possible solution (see *Montana Outdoors*, Sept./Oct. 1986). The Montana Department of Fish, Wildlife, and Parks has supported the conversion to non-toxic (steel) shot for waterfowl hunting because it believes that continued deposition of toxic lead into our environment, when a suitable non-toxic substitute is available, is not in the best interests of the wildlife resource. By order of the Montana Fish and Game Commission, steel shot regulations were implemented in several areas of Montana for the 1986 and 1987 waterfowl seasons, and beginning in the fall of 1988, steel shot will be required for waterfowl hunting statewide.

The key to the success of the non-toxic shot program is public awareness and understanding. Without these elements, it is unlikely that compliance with a steel shot regulation will be sufficient to significantly reduce wildlife losses to lead poisoning. It is essential to provide up-to-date information to the waterfowl hunter that explains the effective use of steel shot and how it differs ballistically from lead. As hunters develop an understanding of how steel shot works and which loads are most appropriate for various hunting situations, they will be much more effective in their shooting. Most important, waterfowl hunters will be able to continue to enjoy their sport knowing they have not contributed to the unnecessary loss of waterfowl to lead poisoning.

What is steel shot and how does it compare with traditional lead shot loads? Many questions concern shot size, velocities, downrange energy, patterning performance, and barrel damage. Let's answer these questions with information provided by ammunition manufacturers and ballistics experts.

photo: WALTER HINZ

Shot Size, Weight, and Velocity

Pellet sizes for both lead and steel shot correspond to those of the American standard shot size chart (Figure 1). A #6 lead pellet is the same diameter as a steel #6 pellet, although the steel pellet is much harder and rounder than the lead pellet.

A steel pellet weighs about one-third less than the same size lead pellet. A 1 1/8-ounce load of #2 steel has approximately the same volume as a 1 1/2-ounce load of #2 lead. Because steel pellets weigh less, they lose energy faster downrange. To compensate for this loss of energy, steel is loaded at higher muzzle velocities. As a rule of thumb, hunters should use steel shot two sizes larger than their customary lead pellet choice to obtain equivalent energy (Table 1). So, if you previously used #5 lead for your duck shooting, #3 steel loads will provide very comparable ballistic performance. You might now ask, "By going to the larger pellet size, won't I lose pattern density?" The answer is "No," mainly because steel loads pattern better than lead loads and thus deliver comparable pellet counts downrange. The following section explains this more fully.

Shot Hardness, Pellet Counts, and Pattern Performance

As mentioned earlier, steel or soft iron shot is much harder and rounder than lead shot. Using the Diamond Pyramid Hardness (DPH) scale, the maximum rating for soft steel pellets used in commercial loads is 90 DPH. Hard lead shot (which has been alloyed with other substances, mainly antimony and arsenic) has a DPH rating of 30 to 35. Because lead is so much softer, it has a much greater tendency to deform under the forces of ignition in the shotshell. Approximately 85% to 90% of lead shot deformation occurs before the pellets strike the target. Because steel pellets are harder and have a much lower tendency to deform, they exhibit a much tighter pattern and shorter shot string.

The idea behind lead shot wads with their over-powder cushioning section—as well as the use of copper plating and

shot buffers—is to reduce the amount of shot deformation, thus improving patterning performance. The function of the steel shot wad, however, is not to prevent pellet deformation, but to protect the gun barrel from the much harder steel pellets. The thickness of the walls of the steel shot wad and its overall length have been increased for additional barrel protection, and this has virtually eliminated the problem of barrel or bore erosion. Because the steel shot wad doesn't need a cushioning section, it has more room for shot pellets than its lead counterpart.

Thus it is possible to select a larger shot size when using steel and still maintain good pattern density for two reasons: (1) steel patterns better than lead, and (2) there is more room for pellets in the steel shot wad. A 1 1/4-ounce load of steel #2s contains 156 pellets, while a 1 1/4-ounce load of lead #4s contains approximately 170 pellets. Although the steel load has slightly fewer pellets it actually patterns better because a higher percentage of pellets reach the target. These factors, combined with the comparable downrange energy levels of lead #4s and steel #2s, result in shotshell loads with similar ballistic performance (Table 2).

Proper Choke

For shooting at distances under 50 yards, hunters will usually find that improved cylinder and modified chokes will perform much better with the tighter patterns and shorter shot strings characteristic of steel loads. In fact, the average hunter may be using a gun that is "over-choked" for both steel shotshells *and* current lead loads. A full choke is a good choice when using steel shot *only* for pass shooting beyond 50 yards. Unfortunately, the vast majority of waterfowl guns in use today have full chokes. When switching to steel shot, the majority of waterfowl hunters today will have to make a change in their gun's choke to shoot steel effectively. In reality, an improved modified choke (a constriction midway between modified and full) is probably as tight a choke as will ever be needed to shoot steel, and then only in very specific and demanding conditions. Hunters should pattern their guns with various loads to check performance and to find the best loads for their particular type of shooting.

Several alternatives exist for modifying the choke constriction of your gun if you wish to do so. These include having the choke bored out to a more open configuration, installing screw-in or adjustable chokes, or buying a new barrel. If you decide to install screw-in chokes, be sure to buy a brand guaranteed to be steel shot-proof for the pellet sizes and choke constrictions you intend to use. Many of the screw-in chokes now on the market develop problems when steel shot size #1 or larger pellets are fired through tubes choked tighter than modified.

Gun Damage

Early steel shot loads did in fact damage some gun barrels. However, the entire shot charge is now enclosed in a tough plastic shotcup that virtually eliminates contact between the shot and the inside of the barrel. Bore erosion is presently no greater with steel than with lead.

Table 1
Comparison of Lead vs. Steel When Compensation is Made by Weight

Shot Type	Shot Size	Velocity (FPS)	Retained Energy (ft. lbs.) 40 Yds.	60 Yds.
Lead	6	1330	2.3	1.3
Steel	4	1330	2.4	1.3
Lead	4	1330	4.4	2.7
Steel	2	1330	4.3	2.6
Lead	4	1260	4.1	2.6
Steel	2	1275	4.1	2.4
Lead	2	1260	7.0	4.6
Steel	BB	1275	8.3	5.2
Lead	2	1210	6.7	4.4
Steel	BB	1210	7.7	4.9

Source: New SAAMI Exterior Ballistics Tables Adopted 4-23-81

However, steel loads and magnum lead loads may cause a slight expansion of the choke (ring bulge) in some tightly choked shotguns and in those made with soft steel barrels. Ring bulge is caused by the higher pressure of these loads and the resistance of the shot charge to being compressed as it enters the choke. Ring bulge is essentially cosmetic and does not affect the performance or the useful life of the shotgun.

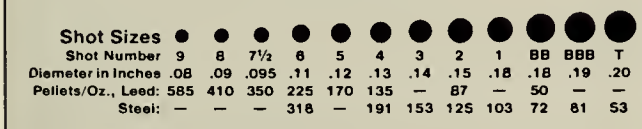
Older, soft-steel American double barrels, such as L.C. Smiths and Parkers, and some modern guns made in other countries are not recommended for steel shot. In addition, some Brownings with full chokes are subject to ring bulge if used with larger-sized steel and lead pellets. Hunters who are not sure if steel shot loads will damage their guns should contact the manufacturer or the author.

Table 2
Comparative Patterning Performance* of Comparable 2¾" 12 Gauge Lead and Steel Shot Loads

Loads	In-Shell Pel. Ct.	40 Yards Pel. Ct.	60 Yards Pel. Ct.
1-1/2 Oz.		70% Ave.	30% Ave.
No. 4 Lead	195	135	56
1-1/8 Oz.		82% Ave.	50% Ave.
No. 2 Steel	130	107	64
1-1/2 Oz.		74% Ave.	34% Ave.
No. 2 Lead	130	100	46
1-1/8 Oz.		83% Ave.	56% Ave.
BB Steel	82	70	46

**Using production line 30" full-choke guns and 30" patterning circle, lead loads are non-buffered, 40° F (+ or -) SEA LEVEL*
Tom Roster

Figure 1
Shot Specifications



Shot Sizes	9	8	7½	6	5	4	3	2	1	BB	BBB	T
Diameter in Inches	.08	.09	.095	.11	.12	.13	.14	.15	.18	.18	.19	.20
Pellets/Oz., Lead:	585	410	350	225	170	135	—	87	—	50	—	—
Steel:	—	—	—	318	—	191	153	125	103	72	61	53

Source: Winchester Shotshell Game Guide

Shooting Steel and Crippling Losses

Although some waterfowl hunters will not notice a difference between shooting lead and steel loads, other shooters may have to make adjustments. Remember that steel shot leaves the muzzle with a higher initial velocity but then slows down faster as it moves downrange. The general rule is to shorten your lead when shooting steel at targets at less than 30 yards, use about the same lead for shots between 30 and 50 yards, and increase your lead for longer shots.

Numerous studies have been done to determine the relative crippling rates of lead versus steel shot. Only one of 14 tests found that steel crippled more birds than lead. One test showed lead crippling more than steel, while the other 12 tests showed no significant difference between the two. These data indicate that crippling losses from the use of steel shot should not be of major concern.

Increased hunter understanding of the proper use of steel shot can minimize crippling losses. In addition, hunters can improve their shooting success by taking the time to pattern their guns so they know how they shoot and by learning to recognize the distances over which they are shooting.

Hunters should pattern their guns with steel loads to check performance. For geese, steel shot in sizes #1, #BB, or #T works well.

TIM MANLEY

Ballistics researchers have field tested many of the steel shot loads currently available commercially. Number 4 steel shot for ducks and #2 steel for geese are two loads which appear to have a narrow range of effectiveness and a disproportionately high crippling rate. We recommend in each case that one pellet size larger than these be selected. When #4 steel seems appropriate, based on the expected range of the target and size of the ducks to be taken, #3 steel would be preferable. When #2 steel seems appropriate for geese, based on expected range and the species of goose, #1 would probably be preferable. Steel #3s are proving to be an effective, all-around duck load. For close range duck shooting over decoys, for a variety of different sized ducks, #6 steel would probably be best. Steel #2s and #1s are lethal for large ducks out to 65 yards when loaded in large-volume loads which assure adequate pattern density. For geese, #BB (.180 inch diameter) steel is effective to 60 yards while #T (.200 inch diameter) steel is recommended for shots ranging out to 70 yards. Remember that the use of large pellets in a full choke will result in poor pattern performance and ring bulging in some guns. Recent field tests with #F steel (.220 inch diameter) indicate very poor patterning performance. The use of this shot size is not recommended.

Cost of Steel Shot

Some of the components which comprise a steel shotshell, especially the pellets, cost more than those in a lead shotshell. As a result, steel shotshells tend to be more expensive than lead. It is difficult, for example, to buy a cheap steel shotshell for close-range duck shooting over decoys which costs as little as the common "duck and pheasant" shell. Conversely, many magnum lead shotshells loaded with 1 7/8 ounces of hardened or plated shot commonly cost more than a 1 1/4-ounce, 3-inch load of steel shot. Both are designed for the same purpose. Steel handloads can be loaded for under $5 a box, while some light lead loads can be loaded for a little over $2 a box. This "numbers game" is really misleading because we are comparing apples and oranges. Typically, the cheapest steel shot load commercially available patterns better and delivers more pellets to the target than the cheapest lead shot factory shell commonly marketed as a duck load. The bottom line is, in terms of the cost per pellet actually delivered to the target in steel versus lead loads, the steel loads are competitive with lead.

RELOADING STEEL SHOT

by Tom Hinz

Before getting into reloading steel shot in any detail, a disclaimer is appropriate. The information contained below is based in part on my own experience over the past four years in loading steel shotshells using components marketed by one company, and shooting them in my shotguns during hunting season. Having spoken to sportsman's clubs, ammunition dealers, and hunter safety instructors throughout eastern Montana

I have come to realize that although my experience with reloading is incomplete, it is sufficient to answer most commonly asked questions. It is my intention to share this experience with you. Further information can be obtained by carefully reading and re-reading the manual which comes with your steel shot reloading components. Remaining questions can be directed to me at the Department of Fish, Wildlife and Parks, 1125 Lake Elmo Drive; Billings, MT 59105 (406/252-4654).

Part of the reason for the slow evolution from lead to steel shot for waterfowling has been the unavailability of reloading components for assembling a safe steel shot load. Even at present, there remain those in the shotshell and arms industry who insist that steel shot cannot be safely handloaded for use in sporting arms. This simply is not true. Happily, the 1980s has brought more extensive testing of components and the assembly of a variety of steel shot loads for hunting. Much of this testing has been accomplished through the Cooperative Lead Poisoning Control Information Program to which the Montana Department of Fish, Wildlife and Parks contributes annually. In combination with an ever-increasing variety of factory steel ammunition, the waterfowler now has at his disposal steel handloads which, in most applications, are fully the equivalent of lead shot loads.

At present, there are four companies marketing steel shot reloading components. To my knowledge, only one sells components that have been fully subjected to testing by independent laboratories, including barrel damage testing. That company is Mayville Engineering Company (MEC), 715 South Street; Mayville, WI 53050 (414/387-4500). (Mayville recently acquired Non-Toxic Components [NTC] of Portland, Oregon, a major supplier of steel shot components.) Having reloaded and shot these components for four years, I am confident that use of their components as directed is a safe and economical way to produce steel shot handloads.

Before getting into steel shot handloading, it would be worthwhile to reflect a moment on your reasons for wanting to reload. It needs to be said up front that if you are a waterfowler who shoots one or two boxes of shells per season, and you are not now set up to reload, it probably isn't worth the expenditure of time or money to reload steel shotshells. But if you are like me and you shoot many boxes of shotshells each year, perhaps in target practice, upland game bird shooting, or in waterfowling, you might seriously consider reloading. Not only is it rewarding to take a bird with a shell you yourself fabricated, but the activity of reloading itself is often a relaxing, enjoyable way to spend a winter evening or weekend in anticipation of the coming fall hunting season.

Reloading steel shot is similar to reloading lead in many respects and different in a few. The main differences relate to retrofitting your press to load steel; buying steel shot, wads, and powders; and a few changes in the reloading process itself. Reloading steel is similar to lead reloading in that most of the same reloading tools can be used; many of the reloading steps are identical; some of the same primers and powders are used; and the same hulls are used.

Most of the shotshell reloaders in use today are manufactured by MEC. All single-stage and progressive reloaders currently made by MEC can be retrofitted to load steel shot. If the reloading tool you own is not an MEC, I suggest you write the manufacturer to request information on retrofitting that press. Retrofitting in the case of MEC single-stage reloaders means installation of a "steel shot reloader kit" and purchasing of steel shot charge bars. The kit consists of a shot bottle and drop tube which have larger inside diameters to minimize problems with the shot bridging during its travel from the bottle to the hull. This is a greater problem with steel shot than with lead due to the larger pellet sizes used in steel shotshell reloading. Steel shot charge bars differ from those used to load lead in that a rubber insert is used near the shot opening in the bar to roll rather than shear pellets that become trapped between the bar and its housing as the bar is moved from side to side. A universal charge bar is now available for reloading steel shot which also incorporates a rubber insert into its design.

Another point to consider in tooling up to load steel is resizing the head of the hull. Most waterfowl hulls in use today are made with steel heads. That is, the "brass" is not brass. In hulls with a high head (high "brass"), resizing of the head is necessary when steel shot will be repeatedly fired from that hull. Reloaders who will be using this type of hull will need a reloader with a resizing die which will fully resize the head all the way to the end, or will need to purchase such a resizer. The use of low base hulls, such as Winchester AA or Federal Gold Medal, would not require this degree of resizing. The MEC "Sizemaster" is an example of a reloading tool having a collet-type resizing die which will adequately resize a high base hull with a steel head.

Would-be reloaders often ask which hulls are acceptable to use in reloading steel shot. MEC currently has recipes for loading steel shot in every domestic shotshell hull as well as several of foreign manufacture. Their 1988 edition booklet (which is included with the shot and wads when purchased) lists 108 steel shot loads.

An exciting development is that starting this year, reloaders will be able to buy steel shot wads pre-slit, ready for loading. Previously, wads had to be slit individually as the tooling to do so had not yet been developed by MEC. The availability of pre-slit wads will make steel shot reloading easier than in the past.

Winchester and Federal 209 primers are used for reloading steel shot; these are the same primers used for some lead loads. *Reloaders are strictly cautioned not to substitute primers or any other components in loading steel shotshells. Such substitutions will likely result in gun damage or serious personal injury.* If steel shot reloading differs from lead shot reloading in any significant way, this is it. The steel shot loader simply cannot afford to be sloppy in the way he assembles his loads. The MEC booklet strictly states that powder charges must be within 0.5 grains of the recommended amount in the recipe, and that shot charges must be within 25 grains of the recommended amount. Due to the higher chamber pressures of the steel loads and the lack of compressibility of the steel shot charge once the primer is ignited, small overcharges of powder or shot will produce major changes in pressure that can exceed the capability of the gun to contain that pressure. Anyone unwilling to meticulously assemble steel shot handloads to keep them within the limits stated above should not consider reloading steel. I recommend using a 1,010-grain capacity scale to periodically check the

DAVE BOOKS

Steel #3s are proving to be an effective, all-around duck load, while steel #6s work well for close range shooting over decoys. By using steel shot, hunters are doing their part to ensure the future of waterfowl and waterfowl hunting.

amount of shot and powder the reloader is "throwing" to make sure those amounts remain within the suggested limits. Anyone willing to do this can and will produce steel shot handloads which will be both satisfying to produce and rewarding to shoot.

Waterfowlers desiring to make their sport even more challenging through the use of muzzleloading shotguns will also find loading information for steel shot. MEC's 1989 edition manual is slated to include loading data for some specific muzzleloading guns, including Navy Arms, CVA, and others. The Cooperative Lead Poisoning Control Information Program has also conducted destruction tests on four representative muzzleloading shotguns using the highest pressure load developed thus far. This information should be available shortly. Since muzzleloaders are virtually unprooftested in this country, such data are lacking.

Commercially available steel shot loads are now available in eight shot sizes from #F shot to #6. MEC markets all pellet sizes from #T through #6, and has recently added #7 steel shot. For those reloaders who want to use #7 for clay target practice to gain proficiency in shooting steel shot or perhaps for some upland game bird hunting, #7 steel will prove to be just the ticket.

Reloaders frequently ask where steel shot reloading components can be purchased in Montana. As a result of our ongoing information program, some dealers have expressed an interest in carrying the MEC products but present availability is very spotty. I recommend ordering the products directly from MEC, from one of many mail-order sporting goods houses, or asking your local sporting goods dealer to order for you. MEC currently markets four different wads for reloading steel shot: MEC 122, for 7/8-, 1-, and 1 1/8-ounce loads in 2 3/4-inch, 12-gauge hulls; MEC 12TW, for 7/8-, 1-, and 1 1/8-ounce loads in 2 3/4-inch, 12-gauge tapered-wall compression-formed hulls such as Winchester AA's; MEC 312, for 1 1/8- and 1 1/4-ounce loads in 3-inch, 12-gauge hulls; and MEC 105, for 1 3/8-, 1 1/2-, and 1 5/8-ounce loads in 3 1/2-inch, 10-gauge hulls. There are no wads currently available for other gauges. Again MEC strictly cautions reloaders not to load their shot in any non-MEC wads as serious gun damage may result.

Although steel shot for reloading is lightly treated to inhibit rust development as a result of humidity and light moisture conditions, submersion of the shell is another story. To protect shells against pellet fusion due to submersion in water or prolonged exposure to moisture, I recommend that they be sealed at the crimp with nail polish, wax, or shellac.

A Shot for Waterfowl

By learning the facts about steel shot and developing the skills to shoot it, you can contribute to the conservation of Montana's and the nation's waterfowl resource. You will be able to leave your favorite waterfowling spot knowing that hit or miss, you haven't left a toxin behind that will continue to kill waterfowl long after you've left. As a concerned hunter, you will be doing your part to ensure the future of waterfowl and waterfowl hunting. ■

Sounds

story and photos by Mike Logan

"What's that, Dad?"

I must have jumped a little.

The image of the tiny farm pond, its single bare-boned hedge tree softly fired by the Kansas sunset, slipped away.

Again the hauntingly beautiful "To WHOOO who who who" drifted through the Montana twilight. The doleful cooing had carried me back to my Southeast Kansas boyhood. I had smelled the fresh-cut kaffir corn and the hard-baked gumbo bottom, cracking where the pond bed showed.

"It's a dove, Marco."

We sat by the campfire, my sons and I, and watched the day die slowly in the west.

"To WHOOO who who who."

I smoked my pipe and thought about the sound.

It separated us. My sounds are different than my sons' sounds.

Growing up in Montana, they share the high-country melodies I know. The melancholy yodel of the loon, they've grown up with, and the strident bristling challenge of the bugling bulls, and the melodious high-skied song of the whistling swan.

They've heard the swirling slurp of big browns sucking in the stonefly hatch, and the rusty-hinged rasping only a female yellow-headed blackbird could love.

Unknown to most, the twanging whoosh of an alarmed momma pronghorn, the curious dancing "gerbloop" of the strutting sage grouse, and the guttural clacking of the sandhill crane are familiar friends to Mark and Sean.

But they cannot feel my sounds of home. They cannot hear with my ears the deep-throated booming of the bullfrog set to the violins of his tiny tree-dwelling brothers.

I wish they could hear, as I do, the moonsong of the prairie coyote. We've heard his mountain cousins, but it's never quite the same.

I'd like to introduce my sons to the dusky, oval-toned loveliness of the bobwhite, calling in the gold-edged grasses of my memory.

"To WHOOO who who who." The boys hadn't recognized the loneliest of my sounds. They'd identify it now, but not with the happy sad flavor it will always bear for me.

Someday, when the bull elk's eerie whistling cough keens down the mists of the Yellowstone, they'll sit around another campfire and their sons will ask, "What's that, Dad?"

Then they'll know. ■

The passage of a hallmark bill by Montana's 1987 Legislature promises elk, deer, bighorn sheep, and myriad other wildlife species even more . . .

HABIT

On the Sun River Wildlife Management Area (WMA) west of Augusta, elk, deer, and bighorn sheep find solace from the rigors of winter in the shadows of the Rocky Mountain East Front. Nearly 300 miles to the east, at the Seven Sisters WMA, ring-necked pheasants and white-tailed deer find a plethora of vital cover and nutritious forage beside the sweeping flow of the lower Yellowstone River.

Throughout Montana, from the rugged prairie breaks in the east to the timbered ridges of the Cabinet and Bitterroot ranges, myriad species of wildlife are experiencing firsthand the benefits of 56 invaluable gifts to wildlife from the sportsmen of the Treasure State. These "gifts" form a system of WMAs that provide and protect the habitat needs of Montana's heralded wildlife resource.

From the late 1930s to the present, over 300,000 acres of Montana have been set aside for the primary purpose of meeting the needs of wildlife. In the past, suitable acres were acquired by the sportsmen of the state, under the auspices of the Montana Department of Fish and Game, as lands became available and the necessary funding was found in existing wildlife program budgets. Now, however, thanks to passage of a hallmark bill by the 1987 Montana Legislature, the giving of such "gifts" to the wild creatures with which we share the state's 92 million acres will undoubtedly become a much more common occurrence.

That measure, passed as House Bill 526 and known in conservation circles as the "wildlife habitat bill," raises fees paid for certain hunting and fishing licenses and earmarks the revenues gained through these increases for conservation easement, lease, or, when appropriate, acquisition of important wildlife habitat in the state. Most of the new funds will be realized through an increase in various non-resident hunting licenses. Specifically, the non-resident combination big game hunting license fee was raised from $350 in 1987 to $450 this year; the cost of an upland game bird license was raised $18, from $35 in the past to $53 in 1988; the price of a turkey tag was increased from $3 to $10; and non-resident license fees for black bear, antelope, moose, bighorn sheep, mountain goat, and mountain lion were upped by $20 each. In addition, the price of a resident sportsman's license was raised from $36 in 1987 to $45 in 1988. In combination, these increases are projected to raise from $2 million to $2.5 million annually for the benefit of Montana's wildlife. As stated in the bill, 20% of the amount generated by the bill each year will be set aside in a trust fund for development and maintenance of acquired properties as wildlife areas.

The relative importance of this bill and its passage, which was realized through the noteworthy cooperation of Montana's agricultural community, conservation and sportsman's organizations, and the department, is reflected by the fact that it is now being lauded both by the Department of Fish, Wildlife and Parks and state conservation organizations as one of the most significant pieces of legislation ever passed in Montana, if not the nation, for the benefit of wildlife. Likewise, the impact the increased revenues provided by the measure will have on wildlife and DFWP wildlife management programs has encouraged the state's wildlife managers and conservationists alike.

AT FOR THE FUTURE

by Bill Phippen
illustrated by Robert Spannring

"The new money the wildlife habitat bill will provide will certainly give a great boost to our existing habitat and game range management program, not only here in western Montana, but in the rest of the state as well," says John Firebaugh, the department's wildlife manager for Region 2 (Missoula).

Firebaugh says long-range regional priorities to protect the wildlife habitat values on additional lands near or adjacent to present WMAs in Region 2 are now being moved from the "wish-list" category to the "realistically possible" category, thanks to passage of HB 526.

Glenn Erickson, chief of the DFWP Wildlife Management Bureau in Helena, concurs with Firebaugh's assessment of the importance of the new funds. "Any time you can provide wildlife with more of the habitat that is vital for meeting their needs, more lands on which to roam without the threat that those lands might not be available tomorrow, it can only spell good for the resource itself."

And in the words of Tony Schoonen, president of the Montana Wildlife Federation, a group deeply involved in the bill's introduction and instrumental in its ceremonious success: "The importance of this bill and the funds it will provide for wildlife cannot be overstressed. We worked as hard or harder for the passage of this bill than we did on any other in the 1987 session because we, as a federation, and our affiliated sportsman's groups recognized the present and growing need for habitat in the public domain. The tolerance of private landowners has just about reached the breaking point as far as wildlife is concerned, so if we are going to increase wildlife numbers to meet the continuing growth in public demand, we've got to secure more public areas for their use. We see passage of the bill as a move that will pay off for all future generations, both of wildlife and Montanans."

Despite the seemingly unanimous realization among wildlife managers, Montana's conservation community, and the state's citizens that securing additional lands specifically for their wildlife habitat values is a move the department should be making now for the benefit of the state's wildlife in the future, some initially viewed HB 526 with skepticism. Concerns, as pointed out in the legislative process through which the bill was passed, centered around the question of what effect taking additional private lands out of agricultural production and transferring them into public lands would have on the state's agricultural economy in the future, and also what effect this would have on tax rolls.

The new law's statement of intent, which was required because the Montana Fish and Game Commission would be mandated to adopt rules for acquiring new lands under the bill, addressed these and other concerns:

> It is the intent of this act to provide a means for the Department of Fish, Wildlife and Parks to acquire an interest in land for the purpose of protecting and enhancing wildlife habitat. Such interest in land must be gained by the purchase of leases, conservation easements, or fee title. While it is preferable to acquire such interest through lease or conservation easement, the legislature

continued on page 34

Cheating Lady Luck

Billy Cobb, a Cody, Wyoming, attorney, has found a way to beat the normal 25-1 odds of obtaining a bull moose license through Montana's annual drawings and, in so doing, cheat Lady Luck.

Cobb's trick: Put some hard, cold cash on the line. And that's exactly what he did when his bid of $7,250 was accepted as the highest for Montana's 1988 first-of-state Shiras moose auction license.

The license, auctioned by the Montana Chapter of Safari Club International (SCI) at its annual convention in Billings, allows Cobb to hunt a bull Shiras moose in any Montana hunting district open to moose hunting this fall. The auctioned permit will not reduce the number of moose permits that the DFWP will issue to meet management objectives in individual hunting districts, nor will a moose taken with this license count against any established district harvest quotas.

Senate Bill 109, passed by the 1987 Montana Legislature, authorized the Department of Fish, Wildlife and Parks to issue one bull Shiras moose hunting permit each year through a competitive auction to generate funds for moose management. The organization conducting the auction must be involved with moose conservation; it can keep 10% of the amount bid to help defray costs of holding the auction. The rest, $6,525 this year, will be channeled directly to moose management. Current projects in Montana include determining population levels and monitoring moose movements both at the Red Rock Lake area near Dillon and in the northwestern portion (Region 1) of the state.

The moose license auction follows on the heels of the highly successful bighorn sheep license auction authorized by the Montana Legislature three years ago. Since 1986, the Foundation for North American Wild Sheep has auctioned three Montana bighorn sheep licenses which have generated more than $250,000 for bighorn sheep management in the state. Just as those funds generated through the bighorn sheep license auction have provided valuable funding for expanded bighorn sheep management, Cobb's winning bid represents a positive contribution toward future moose management in Montana.– *Mark Bennett, writing intern, Conservation Education Division, Helena*

Bronzes Help Heritage Park

A sculpture commissioned because state law requires art in new state buildings will more than pay for itself—through sale of miniatures, it will enable acquisition of land near Giant Springs Heritage State Park, Great Falls.

Sculptor Joe Halko of Cascade was commissioned to produce a bronze of four geese that now stands in front of the Region 4 (Great Falls) headquarters of the Department of Fish, Wildlife and Parks. An edition of 100 miniatures of the sculpture is expected to raise $40,000 for purchase of land adjacent to the 100-acre park.

"We ultimately would like to acquire all of the land Sunlight Development (a Montana Power Company subsidiary) has between Black Eagle Falls and the Rainbow Falls overlook," said John Seeberger, chairman of the Giant Springs Heritage Park Commission. "The intent is to preserve that as a greenbelt area, or for future park expansion."

The commission would like to acquire six parcels of land totaling about 100 acres. Its first priority is to acquire the land between the road and the Missouri River from Black Eagle Falls to Giant Springs. No price has yet been set for the land. "We're in the process of coming to a meeting of the minds now of what the land we want to acquire is worth," Seeberger said. "That $40,000 is a demonstration to the people we're dealing with that we are serious about trying to acquire this."

Twenty-five of the miniatures already have been sold for $800 apiece. Out-of-staters bought five, and DFWP employees—who see the large sculpture when they go to work each day—bought four. "For a lot of people, it was the first time they had bought a bronze," Halko said. "It makes for a nice feeling—getting something and helping out the community." The $800 price is less than customary for his bronzes, Halko said, but the edition is larger. "It's a good bargain," he said.

The regional headquarters had 35,000 registered visitors from its opening in June 1987 until the end of the year. "They represented virtually every state in the nation and many foreign countries as well," said Dan Vincent, DFWP regional supervisor. "There's hardly a visitor who doesn't snap a picture of the geese," he said. "We encourage kids to crawl right up the backs of the geese. If folks want to take a picture, that's what those geese were made for."

Some visitors had asked if they could buy miniatures of the geese, thus providing the idea on which the Heritage Park Commission followed through. The commission is comprised of community volunteers who have donated time and money to expand Giant Springs from a park including just the springs and a fish hatchery to a riverfront park. The park now includes the regional DFWP headquarters, and it has been proposed as the site of a national visitor center to interpret the Lewis and

Clark expedition.

Besides the $1.1 million spent on the regional headquarters building, about $1 million has been spent on acquisition and development at the park during the past decade, Vincent said. "Nothing is impossible with the Giant Springs Heritage Park Commission," he said. "It's a very visionary group of individuals with a lot of tenacity."

The commission has been granted sole authority from the Montana Arts Council, the DFWP, and Halko to sell the miniatures, with proceeds earmarked for acquisition of land at Giant Springs. "It's another example of the tremendous cooperative effort between the Heritage Park Commission and Fish, Wildlife and Parks," Vincent said.

One of the miniatures is displayed at the regional headquarters for those interested in possible purchase. The commission asks for a $200 deposit and the balance when the bronze is completed. However, the commission would try to work out a reasonable payment schedule for those who couldn't pay all at once. "Our goal is to try and raise money, and we're not going to exclude anybody," Seeberger said. "What you're getting is an opportunity to invest in the future of the entire area out there."

For further information, write the Giant Springs Heritage Park Commission, P.O. Box 1093; Great Falls, MT 59403.—*Bert Lindler, Great Falls Tribune*

"The Last Parable" Wins Again

"The Last Parable," a Department of Fish, Wildlife and Parks documentary that creatively outlines the importance of wild places, has won the Four Star Award in a national film competition sponsored by the Outdoor Writers Association of America (OWAA).

The film, directed by DFWP cinematographer Mike Gurnett, was chosen the best of four finalists by those attending the annual meeting of the North American Association of Fish and Wildlife Agencies. OWAA conducts a preliminary competition in which the finalists advance to the North American. Runner-up was a documentary on the endangered wood stork, produced by the National Audubon Society and the Turner Broadcasting Network.

The OWAA award is the third honor for the "The Last Parable." In 1987, the film won the prestigious CINE Golden Eagle Award and the Best Agency Film Award at the International Wildlife Film Festival in Missoula.

On the basis of the Golden Eagle, the film won an automatic berth to represent the United States in the "Wildlife and Ecology" division at the EKO Film Festival in Czechoslovakia. Judging in that competition is under way.

"The Last Parable" is available free for screening at meetings, classes, or conventions. Copies of the 30-minute film are also for sale, in both 16mm and VHS formats. For more information, contact the DFWP Film Center, 930 Custer Avenue West; Helena, MT 59620 (406/444-2426).

Hunter Ed—"Most Improved"

The National Rifle Association (NRA) has announced that Montana's Hunter Education Program has won the "Most Improved" award in a nationwide evaluation of state-run hunter education programs.

The award is based on the number of students officially certified to hunt, the education curriculum, instructor training, program planning, and the state's hunting-related accident rate.

Tim Pool, coordinator of the Hunter Education Program, said the NRA award is a reflection of the dedication of Montana's volunteer instructors and the department's commitment to teaching the state's young people how to hunt safely and ethically. The award was formally presented at an April meeting of the NRA in Orlando, Florida.

A Fishy Error

We goofed. On June 20, 1987, Richard Lee of Glasgow caught a 20-pound, 7-ounce freshwater drum that broke the previous state record. His name should have been included on the 1987 record fish list (see "The 'Reeeeallly' Big Ones," *Montana Outdoors*, May/June 1988). We were never informed of Lee's fish until his wife, Harriet, called the omission to our attention.

A former Justice of the Peace, Lee is an avid hunter and fisherman and catching a state record fish has been a lifelong dream. He caught his drum in the Prairie Dog Island area of Big Dry Arm near Rock Creek in Fort Peck Reservoir. The previous record, also caught in Fort Peck Reservoir, weighed 17.55 pounds; it was caught in 1985 by Dean Johnson. If Lee's record stands for 1988, it will appear on our record fish list in the May/June 1989 issue.

NONGAME NEWS

Loon Society Formed

A new commitment to the common loon began in Kalispell on May 16, 1988, when the first steps were taken to form a Montana Loon Society. Don Skaar, who has headed the efforts of the Montana Loon Study since 1982 (see *Montana Outdoors*, March/April 1987), announced plans to form the group during an annual meeting of the volunteer observers who collect information on the breeding status of loons at northwestern Montana lakes. During the meeting, observers received their assignments to known and potential lakes where loons breed. The group also reviewed nesting information from previous years and discussed research needs, findings, and problems.

This year, for the first time, a concerted volunteer effort was made to document the timing and extent of loon migration in the state. During April and May, observers monitored 12 lakes that represented a wide variety of Montana's habitats and regions. Preliminary results indicate that loon migration peaks between April 22 and April 26. Although all of the known loon nesting occurs in the northwestern corner of the state, the highest counts were from southwestern Montana at sites such as Ennis Lake (103 loons) and Clark Canyon and Canyon Ferry reservoirs (with a total of 179 loons on April 26).

Studies indicate that efforts must continue to document and, where possible, minimize effects of disturbance during the nesting season. On the average, 38% of the nesting females produce young. This is from 2% to 5% lower than figures from stable populations elsewhere, and may indicate a decline in Montana's loon population.

Creation of a dues-paying, organized society will facilitate the research essential to the continuation of healthy loon popula-

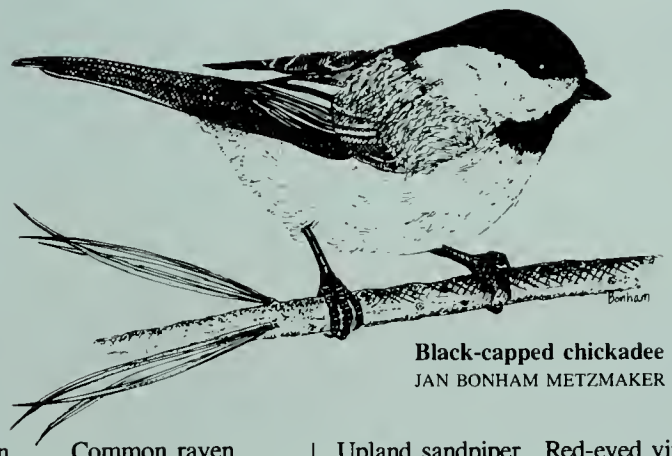
tions in the state. The first meeting of the board of directors is scheduled for July and will focus primarily on bylaws adoption, pursual of tax-exempt status, and other preliminary steps in setting up the organization. Additional news of meetings and activities of the Montana Loon Society will be included in future installments of "Nongame News."

A Big Day

The varied habitats in Montana harbor diverse bird communities, particularly during the spring migration peak in May and early June. With this in mind, the late Larry S. Thompson developed the concept of a "Big Day" route from Freezeout Lake, through Glacier National Park, and into the Flathead Valley. With hard-core birders, a Big Day is a tradition; it's an attempt to see as many species as possible in one calendar day, usually within one state's borders. For the past two years, Jim Rogers of Polson and I have attempted to set a Montana record for a Big Day, using the route Larry had envisioned. Our goal was to beat the record of 154 species, set by other observers several years ago along a route from Billings to Bozeman. In 1987, we saw 136 species. This year, with route revisions, more coffee, and two more observers (Susannah Casey and Sherry Jones), we set out once again. We coordinated our effort with the annual Audubon Society "Birdathon," designed to raise money for both the national and local organizations' educational efforts by gathering pledges for each species seen.

With the memory of Larry, the hope for a record, and a good cause in mind, we began our day with a clay-colored sparrow at 4:20 a.m., June 4, at Freezeout Lake. Eleven hours later, on the summit of Logan Pass in Glacier Park, our total was 114 species and our hopes were still high. At 10:20 p.m. we added our last species, the common tern. Our total? We missed the record by just nine species, spotting 146 species in 18 hours (and 265 miles). Our list follows:

Common loon
Western grebe
Red-necked grebe
Eared grebe
Pied-billed grebe
California gull
Ring-billed gull
Franklin's gull
Forster's tern
Eastern kingbird
Western wood pewee
Willow flycatcher
Least flycatcher
Hammond's flycatcher
Dusky flycatcher
Horned lark
Black-billed magpie



Black-capped chickadee
JAN BONHAM METZMAKER

Common tern
Black tern
Double-crested cormorant
American white pelican
Common merganser
Mallard
Gadwall
American wigeon
Green-winged teal
Blue-winged teal
Cinnamon teal
Northern shoveler
Northern pintail
Wood duck
Redhead
Canvasback
Lesser scaup
Ring-necked duck
Common goldeneye
Bufflehead
Harlequin duck
Ruddy duck
Canada goose
Tundra swan
Great blue heron
Black-crowned night heron
Virginia rail
Sora
American coot
Wilson's phalarope
American avocet
Black-necked stilt
Common snipe
Pectoral sandpiper
Semipalmated sandpiper
Marbled godwit
Lesser yellowlegs
Willet
Common raven
American crow
Clark's nutcracker
European starling
Brown-headed cowbird
Yellow-headed blackbird
Red-winged blackbird
Western meadowlark
Northern oriole
Brewer's blackbird
Common grackle
House finch
Red crossbill
White-winged crossbill
American goldfinch
Pine siskin
Vesper sparrow
Savannah sparrow
Grasshopper sparrow
White-crowned sparrow
Chipping sparrow
Clay-colored sparrow
Dark-eyed junco
Song sparrow
Fox sparrow
Chestnut-collared longspur
Blackheaded grosbeak
Lark bunting
House sparrow
Western tanager
Cliff swallow
Barn swallow
Tree swallow
Violet-green swallow
Bank swallow
Northern rough-winged swallow
Upland sandpiper
Spotted sandpiper
Long-billed curlew
Black-bellied plover
Killdeer
Rock dove
Mourning dove
Ruffed grouse
Ring-necked pheasant
Wild turkey
Northern harrier
Red-tailed hawk
Swainson's hawk
Bald eagle
Prairie falcon
American kestrel
Osprey
Short-eared owl
Belted kingfisher
Red-naped sapsucker
Northern flicker
Common nighthawk
Vaux's swift
Rufous hummingbird
Calliope hummingbird
Black-chinned hummingbird
Veery
Varied thrush
Mountain bluebird
Red-eyed vireo
Warbling vireo
Solitary vireo
Orange-crowned warbler
Yellow warbler
Yellow-rumped warbler
Townsend's warbler
Northern water thrush
MacGillivray's warbler
Common yellowthroat
American redstart
Sprague's pipit
Cedar waxwing
American dipper
Gray catbird
House wren
Rock wren
Marsh wren
Red-breasted nuthatch
Chestnut-backed chickadee
Black-capped chickadee
Golden-crowned kinglet
Ruby-crowned kinglet
Swainson's thrush
American robin
Western bluebird

We were sorry to have missed the record, but of course we're already formulating plans for next year. We raised over $250 for the Audubon Society. And I thought of Larry as the Sprague's pipit sang its song from on high, and as the curlews circled over the grassland....*Daniel Casey, DFWP wildlife biologist, Kalispell*

CONTRIBUTORS

• Steel is not only "A Shot for Waterfowl," it's *the* shot for waterfowl. It will lessen losses of waterfowl to lead poisoning. The Department of Fish, Wildlife and Parks has supported the conversion to non-toxic (steel) shot for waterfowl because it believes that continued deposition of toxic lead into the environment is not in the best interests of the wildlife resource. Beginning this fall, steel shot will be required for waterfowl hunting statewide. For a two-part look at the steel shot issue, turn to page 2 and "Shooting Steel Shot" by **Jeff Herbert**, and "Reloading Steel Shot" by **Tom Hinz**. Herbert is the statewide waterfowl and upland bird biologist; he works from the Wildlife Division's Helena office. Hinz is a wildlife biologist for the department in Billings.

• Growing up in Kansas provides different "Perspectives" on "Sounds." **Mike Logan** grew up as doves cooed, while his sons have grown accustomed to the "melancholy yodel of the loon...the strident bristling challenge of the bugling bulls...the melodious high-skied song of the whistling swan." Turn to his article—which his photographs illustrate—on page 8. Logan is a teacher at Capital High School in Helena. He was the featured poet at the Montana Cowboy Poetry Gathering in 1987 and was Montana's official representative to the National Cowboy Poetry Gathering in Elko, Nevada, earlier this year. He has two books to his credit, "Montana Is..." and "Yellowstone Is...."

• House Bill 526—the "wildlife habitat bill"—raises fees paid for certain hunting and fishing licenses and earmarks the revenues gained for conservation easement, lease, or, when appropriate, acquisition of important wildlife habitat. The cooperation of the agricultural community, the Montana Wildlife Federation, sportsman's clubs, private conservation organizations, and the department resulted in the bill's passage and its guarantee of "Habitat for the Future." **Bill Phippen**'s article begins on page 10. Phippen is the information officer for the Helena region.

• Among those to benefit from the passage of House Bill 526 are deer, elk, antelope, and black bears. Everyone who sees **Robert Spannring's** illustrations of these four wild creatures will also benefit. Spannring has had dozens of successful exhibitions throughout the West, and his work has appeared in these pages and in many other publications. He was commissioned by TW Services to create two series of original prints specifically for the renovation of historic Lake Yellowstone Hotel in Yellowstone National Park. For more information, contact him at The Wade Gallery, 116 North Main, P.O. Box 1055; Livingston, Montana 59047 (406/222-0404).

• "Here's to the Rivers!" And how deserving of that toast they are. People salute rivers for many different reasons, and some believe that any attempt to measure, prioritize, or rank them is a desecration. But facts and figures can also be a valuable tool should development threaten them. Enter the Montana Rivers Study (MRS), the results of which occupy 16 pages in this issue; Part One appeared in May/June. **Janet Decker-Hess**, project manager and writer of the fisheries sections, notes the study would not have been possible without help from personnel of the DFWP, Department of Natural Resources and Conservation (DNRC), U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service, U.S. Geological Survey, The Nature Conservancy and its Montana Natural Heritage Program, and universities and museums. Decker-Hess has been a fisheries biologist with the department since 1979, heading fishery research projects in Dillon and Kalispell. She began working on the MRS in 1985 and has managed the project since fall 1986. **Sally Hilander** undertook the massive project of editing a tall stack of technical documents into a two-part series for *Montana Outdoors*. Due to her love of outdoor recreation, Hilander moved to Helena from Colorado in 1976 and was an environmental reporter for the Independent Record for nearly 10 years. She is now a self-employed writer and editor. Since 1984, **Gael Bissell** has conducted wildlife mitigation research as a DFWP biologist on projects underwritten by the Bonneville Power Administration and the Montana Power Company. She conducted the wildlife assessment for the MRS in 1985 and has recently returned to the project. While pursuing his goal of floating every river in the western United States at least once, **Stewart Allen** has found time to earn his Ph.D. in recreation management from the University of Montana, work for DNRC for five years, and conduct numerous recreational research projects. He is currently a visiting assistant professor at the University of Idaho. **Tom Ring** has worked as an environmental specialist with the Energy Division of DNRC for more than six years. Larry S. Thompson, to whom these rivers articles are dedicated, and Ring were the team which conducted the natural features assessment for the MRS. **Nancy Johnson**, a landscape architect with the Energy Division of DNRC since 1983, helped with the geologic features assessment and final report. Trained as a wildlife biologist at the University of Montana, **Susan Reel** has conducted numerous research projects on nongame birds and animals. Recently, she has begun a career in natural history writing. Reel, with the help of Peter Lesica, who conducted the original assessment of natural features for the MRS, wrote the natural features portion of the final report after Larry Thompson became ill. Join in the salute to Montana's free-flowing treasures; turn to page 17.

• Nobody's sure how he got the nickname, "Hobnail," and nobody's sure how his wife, Helen, got the nickname "Pancake." But the "true facts" aren't too important. Lots of folks like to reminisce about Tom Edwards and his escapades and that makes for some mighty entertaining reading. Turn to **Michael Korn's** article on page 37. Korn is director of the Montana Folklife Project and his preoccupation with yarns of all sorts makes the spinning of this one a natural.

• Mascots usually have names like "Lions," "Eagles," or "Grizzlies." **Mark Bennett** proposes "Muskrat for Mascot," and points to its hardiness and toughness as reasons why. Turn to page 42 to see if you agree with his proposal and to learn more about this fascinating furbearer. Bennett is a writing intern in the Conservation Education Division in Helena.

• It's worthy of being called a "Festival!" Telephone wires buzz as fishermen from all over Montana—and even outside our borders—divulge the news: "The hatch is on! The hatch is on!" But it's more. It's a festival of life, death, and rebirth. It's the bright orange of belly and the unfolding of delicate wings. It's the annual salmonfly hatch, and it's colorfully captured by **Ron Marcoux**, beginning on page 44. Marcoux is the department's associate director.

• **Rich Clough** believes landowners and sportsmen are moving "Toward a Partnership." As he writes, the recreation scene on Montana's private lands is changing, and an increasing number of hunters has strained landowner tolerance. Establishment of a hunter management program, walk-in-only areas, a livestock insurance program, and landowner/sportsman committees are all steps in the right direction. Clough was the department's landowner/sportsman relations coordinator; he was recently named assistant administrator of DFWP's Field Services Division. His article begins on page 46.

• This is the first time work by **Lavon Horne** has appeared in *Montana Outdoors*, and we hope it won't be the last. Horne is a technical illustrator for Wilderness Graphics of Idaho Falls, Idaho. His preferred medium is pen and ink, and he came logically to his love of wildlife in its natural habitat: Both his father and uncle were conservation officers for the Idaho Department of Fish and Game. For additional information, contact him at 3324 South Rustic Lane; Idaho Falls, ID 83404 (208/524-3930).

• *MO* wishes to thank the many, many photographers who helped make this issue of the magazine a salute to Montana's outdoors, and especially to her rivers.

THE MONTANA RIVERS STUDY

DAVE BOOKS

Here's To The Rivers!

Part Two

edited by Sally Hilander

contributors: Janet Decker-Hess, project manager and fisheries; Gael Bissell, wildlife; Stewart Allen, recreation; Tom Ring and Nancy Johnson, geologic features; Susan Reel, natural features

This two-part article is dedicated to Larry S. Thompson, a member of the original study team and the study's data manager. Larry died February 5, 1988, following a fight for nine months with a malignant brain tumor.—Janet Decker-Hess

As explained in detail in Part I of this article (*Montana Outdoors*, May/June 1988), the Montana Rivers Study (MRS) resulted from a need to quantify a river's natural resource values in order to make sound, defensible decisions when development is proposed. The study was initiated by the Northwest Power Planning Council, mandated by Congress in 1980 to develop a program balancing past and future hydropower development in the Columbia River Basin with protection, mitigation, and enhancement of ocean-running and resident fish and of wildlife. A part of that effort was to identify rivers in western Montana with outstanding and unique fish and wildlife values that should be protected from

future hydroelectric development. A measure was included in the council's Fish and Wildlife Program to assess natural resource values of the basin's streams and rivers, with funding supplied by the Bonneville Power Administration (BPA). In addition to identifying stream reaches for the council's Protected Areas Program, study results were also used by BPA for other energy planning programs.

Study participants inventoried and compiled data and determined criteria to assess the significance of a river's fisheries and wildlife values and recreational, natural, and cultural features. Following the assessment, each reach was rated as Class I for unique or outstanding resources, Class II for substantial resources, Class III for moderate resource values, Class IV for limited resources, and Class V for unknown values. Part I outlines the details of the assessment process for each resource area.

Those working on the MRS collected a large amount of natural resource information to identify the most outstanding rivers for protection from any future hydroelectric development. In October 1987, the state of Montana recommended 832 stream miles be protected for their outstanding fishery values and 1,484 stream miles be included for wildlife values in the council's Protected Areas Program. Following a lengthy public comment period, with more than 400 individuals and organizations responding, the council voted unanimously at its April 1988 meeting to consider adoption of a proposed rule which would protect 40,000 miles of streams in four Northwest states from future hydroelectric development, including the 2,048 miles recommended in western Montana. A final decision on incorporating the proposed rule into the council's Fish and Wildlife Program is expected at the August 1988 meeting, following public hearings and comment.

In addition to achieving its original goal, study results are also being used by federal agencies for Wild and Scenic Rivers review and by other agencies and private groups and individuals on a project-by-project basis. Results of the study have provided a perspective of the unique and outstanding character of Montana's rivers. Here is a salute to some of the last of what is best in Montana—our free-flowing rivers, their drainages, and the natural resource values that set them apart, one from the other.

Missouri Headwaters

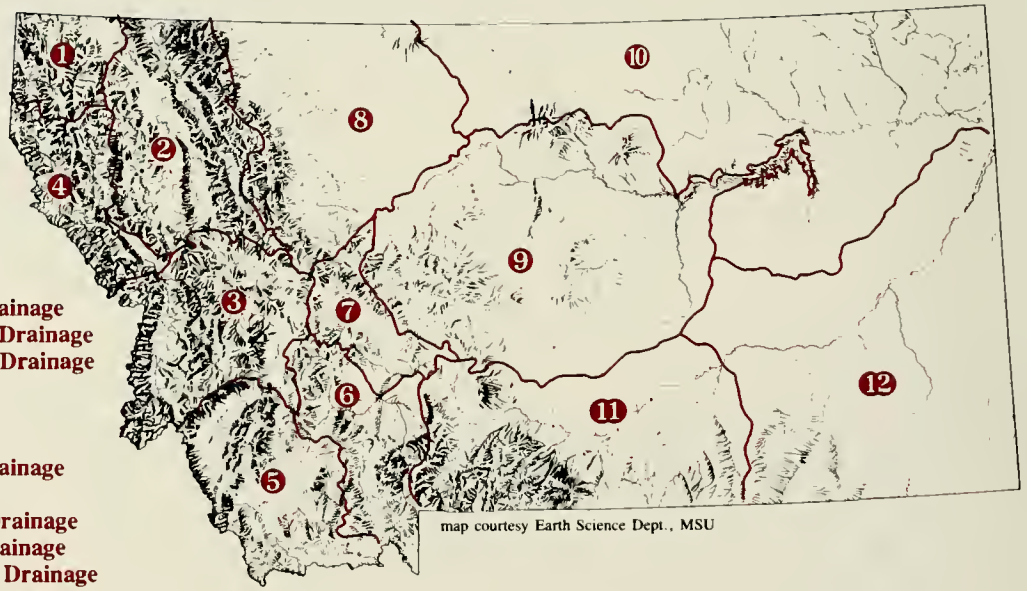
Rivers: Jefferson, Madison, Gallatin
Boundaries: headwaters to Three Forks
Drainage size: 13,513 square miles
Main stem lengths: Madison, 133 miles; Gallatin, 115 miles; Jefferson, 84 miles
Cities/towns: Cameron, Ennis, Gallatin Gateway, Bozeman, Manhattan, Silver Star, Cardwell, Three Forks
Access: U.S. 191 and 287; Montana 2, 41, 55, and 85; Interstate 90

The three headwater streams of the Missouri River emerge from their origins in Yellowstone National Park and four mountain ranges in southwestern Montana, flow through semiarid valleys of sagebrush and grass, and converge at the town of Three Forks. Missouri River Headwaters State Park, a national historic landmark, celebrates Lewis' and Clark's voyage through the area. Not far upstream, in Jefferson River Canyon, is Montana's first state park—Lewis and Clark Caverns. As separate rivers, the Madison, Gallatin, and Jefferson are geologically and historically unique, a fact that adds greatly to their value.

The recreational and trout fishing opportunities in these drainages are among the state's most valued, attracting tourists

The Montana River Drainages

1. Kootenai River Drainage
2. Upper Flathead River Drainage
3. Upper Clark Fork River Drainage
4. Lower Clark Fork River Drainage
5. Big Hole and Beaverhead River Drainages
6. Missouri Headwaters
7. Upper Missouri River Drainage
8. Rocky Mountain Front
9. Central Missouri River Drainage
10. Lower Missouri River Drainage
11. Upper Yellowstone River Drainage
12. Lower Yellowstone River Drainage



map courtesy Earth Science Dept., MSU

from throughout the country and contributing to the decisions of many people to live in Montana. The rivers contain 257 miles of Class I and II sport fisheries, provided entirely by trout produced in the wild. The Montana Rivers Study inventoried recreational attributes on nearly 1,100 miles of river. Managers and river users rated half the river miles as outstanding or substantial. High use, Class I and II scenic quality on most of the miles, fishing, access to wilderness, good trail systems, and hunting opportunities contributed most to recreational value. Only 74 miles of river in the entire state was rated as containing major boatable rapids, and more than a third of these miles was in the Missouri headwaters.

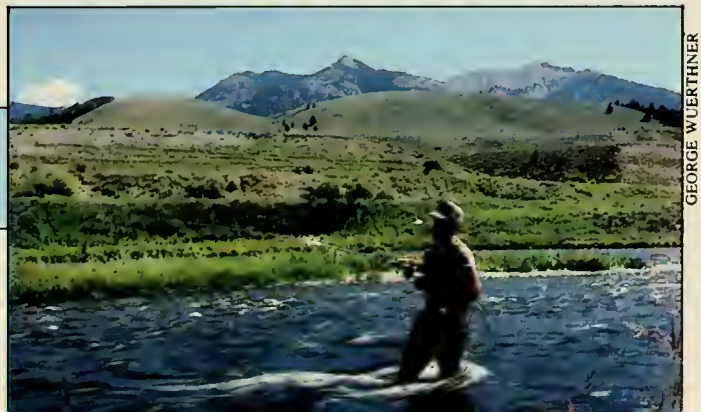
The greatest concentration of named waterfalls outside of Montana's national parks and wilderness areas is found in the headwaters of Hyalite Creek in the East Gallatin drainage south of Bozeman—including Palisade Falls, which tumbles over a cliff of columnar basalt formed when molten rock cooled and contracted, creating vertical joints separating the columns. The Madison, Gallatin, and Jefferson rivers contain 33 botanical natural features sites. Among them is Cliff Lake Research Natural Area (RNA), 25 miles west of Yellowstone National Park, which includes 2,291 acres of unique, high, rolling benchland on ancient volcanoes that rise above a lake impounded by a glacial moraine. Another is Cave Mountain in the Gravelly Mountains, a 1,800-acre RNA featuring sinkholes or caves formed by the erosive action of glaciers on the soluble Madison limestone. Both sites are proposed National Natural Landmarks.

Of the three Missouri headwater rivers, the most familiar is the Madison. No ordinary river, the Madison originates in Yellowstone National Park in the midst of geysers and hot pools, flows swift and straight for 50 miles through an obstacle course including a lake formed by an earthquake and two reservoirs, and then meanders another 80 or so miles before meeting the Jefferson and Gallatin. Below Ennis Lake, the river flows through Beartrap Canyon, an exceptional stretch of whitewater. The Madison is one of only two rivers in Montana that received a Class I designation in the sport fishery value for its entire length. It has been a "blue ribbon" stream since the first state river classification in 1959; in 1985 it received 15% of the total estimated fishing pressure statewide.

The entire Madison drainage received outstanding wildlife species values—the upper river because of an historic peregrine eyrie, nesting bald eagles, and habitat critical for recovery of the Yellowstone grizzly population. The lower river was classified as outstanding for wildlife species values because of habitat supporting waterfowl, great blue herons, double-crested cormorants, and golden eagles. Three of the six Madison units, consisting of tributaries from Ennis Lake to Quake Lake, received the highest game species values in the headwaters due to high densities of moose, bighorn sheep, and mountain goats, as well as terrestrial and aquatic furbearers.

The true Gallatin River main stem flows for only 10 miles before becoming part of the Missouri River, although some

GEORGE WUERTHNER



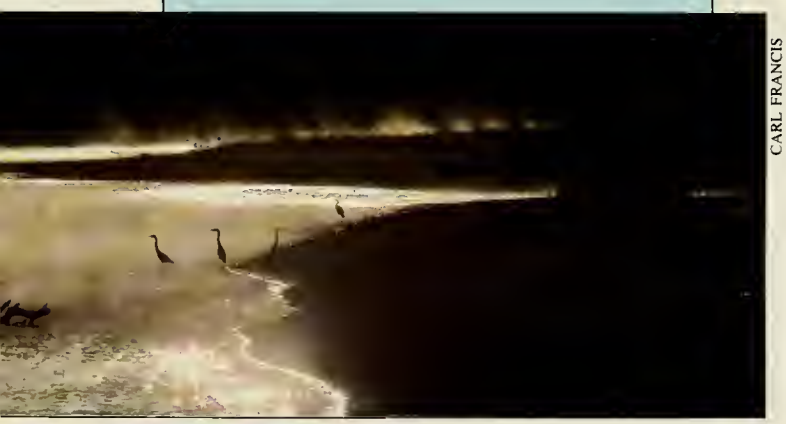
GEORGE WUERTHNER

The three headwater streams of the Missouri—the Gallatin (top), Madison (bottom), and Jefferson—are nationally recognized trout waters.

people refer to the West Gallatin as the main stem. The Gallatin "officially" begins near Manhattan, where the west and east stems meet. The West Gallatin is known for its whitewater challenge, where more than one story can be told about boat-eating House Rock Rapid. Eighty-five miles of the East, West, and main Gallatin received a Class I or II sport fishery value. The 30-mile stretch of the West Gallatin from the west fork to Gallatin Gateway was rated Class I. The lower reaches of the West Gallatin, which suffer from severe dewatering, received a Class III sport fishery value, as did 22 miles of the East Gallatin. Although the East Gallatin contains one of the highest concentrations of spring creeks in the state, many of them have been so altered by irrigation, grazing, and the accompanying sediment, that they no longer provide quality fisheries habitat.

Five wildlife units were assessed in the Gallatin. Both Gallatin main stem sections were awarded high wildlife species values because of river otters, golden eagles, heron rookeries, and warm springs used by wintering waterfowl. Riparian habitat quality was assessed as moderate to low in the Gallatin drainage due to steep canyons and agricultural development. A number of conservation easements have been acquired by non-profit organizations to protect some of these riparian areas.

The Jefferson, with its numerous channels and backwater sloughs, provides habitat for otters, herons (below), ospreys, and migrating waterfowl.



CARL FRANCIS

The "Jeff," least known of the three headwater streams, forms when the Beaverhead and Big Hole converge at Twin Bridges. Despite being dewatered to irrigate the agricultural valley through which it flows, the river provides lush and productive wildlife habitat and a Class II sport fishery. The myriad river channels and backwater sloughs are home to river otters, great blue herons, ospreys, and migrating waterfowl. Golden eagles nest on the cliffs above the main stem. These wildlife values earned the main stem a Class I final wildlife resource value.

The Boulder River, a tributary to the Jefferson, has not fared so well. It received Class III and IV wildlife species and habitat ratings for all five units assessed in the drainage—due to low riparian habitat quality and lack of species diversity. Mining pollution, severe dewatering, and habitat loss due to channel alteration contribute to the Class IV sport fisheries value on 53 of its 67 miles. Although the river once provided outstanding opportunities for whitewater boating during spring runoff, the newly rebuilt Interstate 15, bridging the river more than 40 times, has reduced that value today.

Upper Missouri River Drainage

Boundaries: headwaters to Smith River
Drainage size: 20,941 square miles
Main stem length: 168 miles
Tributaries: Prickly Pear Creek, Sixteenmile Creek
Cities/towns: Townsend, Helena
Access: U.S. 287 and 12, Interstate 15

The Jefferson, Madison, and Gallatin flow gently together from their mountain origins and a powerful, deep, plains river is born. As the "Mighty Mo" begins its 2,474-mile trip to the Gulf of Mexico, it snakes through broad sagebrush valleys and foothills dotted with pronghorns and farmhouses. However, the longest water journey in North America is quickly interrupted as the Missouri River encounters Toston Dam 25 miles below the headwaters and then, in rapid succession, Canyon Ferry, Hauser, and Holter dams—all between the headwaters and the Smith River. The dams were constructed for irrigation storage, electrical generation, flood control, or a combination, and together they impound 64 miles of river.

The free-flowing stretches rate high for fisheries, recreation, scenery, and wildlife. The 15 miles from Toston Dam to Canyon Ferry Reservoir, the mile below Canyon Ferry Dam, a 2.5-mile stretch below Hauser Dam, and the 36 miles from Holter Dam to Cascade all merited a Class I sport fishery

value. The 26-mile stretch from Cascade to the Smith River, where the Missouri meanders through rolling hills and forested north slopes, was rated Class II. The uppermost stretch, 25 miles from Three Forks to Toston, was the only section rated below Class II. According to the fisheries data base, the Class III rating was not because fish are smaller or fewer, but because of limited public access and a lower aesthetics rating. What the Missouri main stem contributes to the sport fishery value, the Prickly Pear Creek drainage contributes in the habitat and species value. Nine reaches were rated Class II or above because of pure or potentially pure populations of westslope cutthroat trout.

The 62 miles of the Missouri River from Holter Dam to the Smith River is second only to the Madison River for fishing pressure. Twenty species of fish in eight families are found here, but the most important fishery is the cold-water salmonid population below Holter Dam. Catchable brown and rainbow trout populations produced in the wild average 2,000 to 4,000 per mile, including 40 to 60 trophy-sized (18 inches or longer) trout per mile.

The excellent fishing on the upper Missouri River contributed to 58 of the 207 drainage miles receiving a Class II recreational value. Limited or restricted access on about 40% of the river mileage probably was responsible for classification of the remaining river miles as Class III or Class IV. From the headwaters at Three Forks to the marshes at Canyon Ferry, the upper Missouri provides a classic Montana floating experience. The bottomland cottonwoods are at their best in

KRISTI DUBOIS

Pelicans (above) utilize the excellent fishery of the upper Missouri, as do their human counterparts (below).

DAVE BOOKS

DAVE BOOKS

The Missouri River (above) begins its 2,474-mile trip to the Gulf of Mexico near the town of Three Forks, where the Jefferson, Madison, and Gallatin merge. The Missouri's tributary basins are rich in wildlife, including mule deer (right).

STEVE WIRT

October, and where the river slips into a canyon, such as the one above Toston Dam, rocky hillsides glow in the evening sun. Scenic quality was rated Class I or II on 23% of the mileage. The upper Missouri River drainage received the second highest proportion of Class I natural features in the state. A good example of why is Middle Fork Canyon on Sixteenmile Creek at the northern edge of the Bridger Mountains, designated a National Natural Landmark because of its unique geology and mixed conifer and deciduous forest.

The free-flowing portions of the upper Missouri River floodplain—where backwater sloughs, cottonwood forests, wetlands, and spring creeks provide habitat for nesting bald eagles, ospreys, and other raptors; great blue herons, double-crested cormorants, and white pelicans; and migrating waterfowl—earned a Class I final resource value. Mule and white-tailed deer, elk, furbearers, and upland game inhabit most of the tributary basins of the upper Missouri, but the drier climate and lower elevations of these isolated mountain ranges do not support as many black bears and moose as do the mountains west of the Continental Divide.

KRISTI DUBOIS

STEVE WIRT

Pine Butte Swamp (above), a Nature Conservancy Preserve encompassing 15,500 acres, provides habitat for many orchids, including the fairy-slipper (right).

Rocky Mountain Front

Rivers: Marias, Teton, Sun, Dearborn
Boundaries: headwaters to Missouri River
Main stem lengths: Marias, 171 miles; Teton, 196 miles; Sun, 107 miles; Dearborn, 67 miles
Cities/towns: Great Falls, Cut Bank, Loma, Choteau, Augusta, Simms
Access: Montana 287, 89, and 2; Interstate 15

Like a mirage shimmering in the desert, the Rocky Mountain Front rises abruptly to 9,500 feet above the prairie grassland. Jumbled peaks, crags, and cliffs of the Scapegoat, Bob Marshall, and Great Bear wildernesses stretch north from Lincoln to Glacier Park and on into Canada. The four tributary streams squeeze through tight limestone canyons before spilling onto the prairie, where they begin lazy meanderings to meet the Missouri River.

The Sun River Canyon northwest of Augusta exemplifies the geologic action that forged the Front. In cutting the canyon, the river exposed large slabs of rock that were shoved on top of one another in a process known as thrust faulting. To build the steep mountain ridges of the overthrust belt, older, light gray Madison limestone was pushed over younger, dark gray shale, much like shingles on a roof. A vast inland sea lapped against the mountains during the late Cretaceous period and in the sediments deposited along this sea, paleontologists have recently unearthed a dinosaur nesting area near Choteau, complete with fossilized eggs, embryos, and young of *Maiasaura peeblesorum*. The Nature Conservancy recently purchased the site, and fossils from it are displayed at the Museum of the Rockies in Bozeman. Another Nature Conservancy site is Crown Butte, a laccolith formed when a pocket of magma was thrust between layers of sedimentary rock. Conservancy ownership assures protection of this pristine native prairie grassland 35 miles west of Great Falls.

From its alpine tundra, forested mountain slopes, and remnant buttes, to lakes, peat bogs, braided streams, springs,

CONRAD ROWE

KRISTI DUBOIS

MICHAEL H. FRANCIS

The upper reaches of the Sun River (above left) originate in grizzly country (left), high in the mountain wilderness of the Rocky Mountain Front. The 76-mile stretch of the Marias River (above) below Tiber Dam supports a tailwater fishery for trout, as well as a fishery for catfish, sauger, and shovelnose sturgeon.

and wetlands surrounded by a sea of prairie grassland, the diverse Rocky Mountain Front provides habitat for a list of wildlife that only begins with long-billed curlews, golden eagles, elk, mountain lions, grizzly bears, and the largest bighorn sheep herd in the contiguous 48 states. Five of the 15 wildlife units assessed along the Front received a Class I final value, with four rating Class I in both habitat and species values. The upper portions of the Sun, Teton, and Marias rivers and Dupuyer Creek received outstanding wildlife ratings.

The largest Nature Conservancy preserve in Montana, Pine Butte Swamp, encompasses more than 15,500 acres in the Teton drainage west of Choteau. Established in 1978, this extensive freshwater peat fen is botanically unique in its proximity to the mountains, foothills, and grasslands. A potpourri of mosses, forbs, and grasses provides habitat for an equally diverse wildlife community, including grizzly and black bears that frequent the marsh in the spring. Another unique natural feature along the Front is the proposed Green Timber Basin-Beaver Creek Forest Service RNA, a candidate for National Natural Landmark designation because it contains some of the rarest orchids found in Montana, including the small round-leaved orchis and the northern lady's-slipper. Six other species of orchids are found around cold limestone springs and seeps. This unique assemblage of orchids is threatened by grazing and mining activities.

The Rocky Mountain Front fisheries are important mainly to the communities of Augusta, Choteau, and Cut Bank. Although the upper drainages of the Marias, Teton, Sun, and Dearborn rivers are protected within wilderness areas and Glacier National Park, they are diverted, impounded, and rechanneled for irrigation once they leave the mountains. Consequently, the Rocky Mountain Front had the lowest number of reaches with a fisheries final resource value of Class I or II of any of the 12 assessed drainages. No reaches received a Class I or II sport fishery value, and only 10 reaches were rated Class I or II for habitat and species value. Ninety percent of the 128 assessed reaches in 1,271 miles received a final resource value of Class III or less.

Among the 86 miles of main stem reaches receiving a Class II final resource value is the 76-mile stretch of the Marias River below Tiber Dam, due to the presence of paddlefish migrating upstream from Fort Peck Reservoir, presumably to spawn. A tailwater fishery for rainbow and brown trout exists below the reservoir, as well as fisheries for channel catfish, sauger, shovelnose sturgeon, burbot, and mountain whitefish.

Extensive irrigation diversions and nine major floods since the late 1800s have reduced the natural fish habitat of the Teton River. Of three reaches inventoried, totaling nearly 200 miles, only a 10-mile reach above Choteau received a Class II habitat and species value, due to its high species diversity.

Despite fisheries that overall fell far short of outstanding, shore fishing was by far the most common recreation activity in the Rocky Mountain Front. It was mentioned as a primary or secondary use on all but two of the 57 river segments assessed. Canoeing was a primary or secondary use on 694 miles, with rafting on half the river miles and kayaking on one-fourth. The Sun River is a good example of the area's whitewater—not awe-inspiring, but requiring some skill and experience. The ledges below Gibson Dam can be tricky for the unprepared.

The Dearborn River, which brought the issue of recreational stream access to the forefront in the early 1980s, received only a Class III in the sport fishery value. The Dearborn is a popular float, containing moderate whitewater and exceptional scenery.

Central Missouri River Drainage

Boundaries: Smith River to Fort Peck Reservoir
Drainage size: 40,987 square miles
Main stem length: 251 miles
Tributaries: Smith, Judith, Musselshell
Cities/towns: Great Falls, Fort Benton, Lewistown
Access: U.S. 87 and 191

The Missouri remains wide and lazy for 32 miles after it is joined by the Smith River, but is then transformed into a seething mass of whitewater as it plunges over a series of five bedrock cascades that earned Great Falls its name. Described by Meriwether Lewis in 1805 as "the greatest sight I ever beheld...a sublimely grand spectacle," these rapids forced the expedition to portage tons of gear for nine miles. Today, hydroelectric dams at the lip of each waterfall have significantly altered their character. The only remaining major whitewater on the Missouri is just below Morony Dam.

Two hundred seven miles from Morony Dam to Fort Peck Reservoir is the Missouri's longest free-flowing section. Preservation of the wild character of this historic river was assured in 1976 when Congress, after a decade of bitter debate, designated the 149-mile stretch downstream from Fort Benton a part of the National Wild and Scenic River system.

The diverse fishery of the central Missouri River drainage allows the angler to search small headwater streams for pure "natives," fly-fish for brown and rainbow trout in the tributaries, or snag paddlefish from the main stem. A total of 2,217 miles of stream in 314 reaches was assessed for fisheries value and the majority of reaches that received a Class I and II final resource value did so due to the presence of species and habitats of special concern. Channel cats, sauger, paddlefish, and sturgeon dominate the fisheries of the warmer, slow-moving water from the falls to the reservoir. This 207-mile section received a Class I final resource value due to seasonal presence of spawning paddlefish and pallid sturgeon, both species of special concern. The lower 75 miles also received a Class I in the sport fishery value. The 40 miles above the Great Falls received Class III final resource values because it is no longer under the influence of the tailwater fisheries of the

CONRAD ROWE

CONRAD ROWE

CONRAD ROWE

The Smith (right), winding beneath high limestone walls dotted with caves, is one of Montana's premier recreational rivers. The remote 60-mile upper section, a three- to five-day float by canoe or raft, offers scenic campsites (above) and wild trout (right).

The Musselshell (below), which joins the Missouri at Fort Peck Reservoir, provides spawning habitat for sauger and channel catfish.

MIKE ADERHOLD

upriver dams and is isolated from spawning migrations of the lower river.

The pristine character of the diverse, abundant wetlands and cottonwood forests earned the entire central Missouri River main stem a Class I wildlife habitat value. Four of the five units assessed on this stretch also received Class I species values because the Missouri provides critical habitat for wintering bald eagles, migrating waterfowl, and nesting herons, ospreys, and golden eagles. In addition, the diverse, forested, and meandering lower portion of Belt Creek received a Class I in both habitat and species values.

Sixty-one segments in 890 miles of the central Missouri River drainage were rated for recreation. Recreation was moderate to heavy on 561 miles, and access was rated as abundant on only about 80 miles. Scenic quality was substantial or outstanding on 23% and moderate on 55%. Shore fishing was the primary or secondary recreation activity on 95% of the river miles and tent camping on 80%.

The central Missouri River drainage has outstanding natural and geologic features as well. Southeast of Great Falls, for example, is the old channel of the Missouri River, which shifted as the continental ice sheet moved south during the last ice age and diverted the Missouri through what is now a portion of Shonkin Creek. The river tumbled over a cliff and formed a plunge pool now called Lost Lake.

Three U.S. Fish and Wildlife Service RNAs have been designated on the central Missouri main stem to protect old-growth trees and native grasslands. Grand, Two Calf, and Dillon islands are unique forest islands protected by the river from grazing. A rare plant called the long-styled thistle, endemic to Montana, inhabits fewer than a dozen sites, all in the Little Belt and Big Belt Mountains.

The Smith, Judith, and Musselshell rivers are quickly transformed from swift mountain streams to mature, meandering rivers by the time they join the Missouri. The Smith River, winding beneath high limestone walls dotted with caves, a few containing Indian pictographs, is renowned as one of Montana's highest quality float trips. Gradually, the Smith cuts its way through foothills and widens into a flat, lazy river flowing through open grazing and cropland before joining the Missouri at Ulm. Eighty miles of the Smith above the mouth was rated as outstanding for recreation, even though access is limited.

DAVE BOOKS

DAVE BOOKS

Because of its remoteness and free-flowing status, the 149-mile stretch of the Missouri downstream from Fort Benton has been designated as part of the National Wild and Scenic River system.

The scenic 60-mile upper section, a three- to five-day float, offers wildlife, wild trout, a tumbling streambed, and a sense of remoteness. Increased use of the Smith has prompted the Department of Fish, Wildlife and Parks (DFWP) to hire a river ranger to assist floaters, establish an ad hoc committee on river management, and institute a voluntary reservation system to help river users avoid peak use periods. The Smith is

a good example of how limited access can add to recreational value.

Dewatering for irrigation of the surrounding agricultural land limits the Smith River floating season to a period from May to mid-July, so use by anglers does not compare with that on other Montana trout streams. Because fishing pressure and access are two factors determining sport fishery value, the highest sport fishery value on the Smith was a Class II. Abundant populations of big game, including mountain lions, as well as bobcats, beavers, and upland game birds in diverse habitat earned the upper Smith River Basin, as well as the South Fork, a Class II wildlife final resource value.

From the rocky tops of the Crazies, Little Belts, Castles, and Big and Little Snowies to the scoria-capped ridges of the Bull Mountains near Billings, the Musselshell River flows 364 miles to join the Missouri in Fort Peck Reservoir. Over-appropriation of its waters has resulted in zero flow near Mosby in 25 of the 50 years the U.S. Geological Survey has been recording flows. Not one of the 38 reaches in the drainage assessed for fisheries received above a Class III in the sport fishery value. Only the lower 90 miles downstream from the town of Musselshell provide a substantial sport fishery and spawning habitat for sauger and channel catfish migrating from Fort Peck Reservoir. Eleven of the 25 wildlife units in the Musselshell drainage earned Class II species and final resource values. Cottonwood forests, abundant wetlands, and important resting areas for migrating waterfowl were major factors in the wildlife values along portions of the main stem and Willow Creek.

From its headwaters in the Little Belts and Big Snowy mountains of central Montana, north across breaks and badlands, the Judith River winds through a remote but significant area of Montana in its 130 miles. One of the better known features in this area is Yogo Gulch, home of the Yogo sapphire, noted for its brilliant blue color. Big Spring Creek, one of the longest, most heavily fished spring creeks in the state, has 31 miles of Class I fishery. Golden eagles and other raptors nest along the Judith River's rough breaks, and its meandering river bottom provides important habitat for migrating waterfowl and wintering bald eagles. The Judith's lower 114 miles earned a Class I wildlife species rating for its support of species of special concern. Because the Little Belts are within easy reach of Great Falls, Billings, and Lewistown, this region is an especially important local recreational and wildlife resource.

MIKE ADERHOLD

Lower Missouri River Drainage

Boundaries: Fort Peck Dam to North Dakota border
Drainage size: 91,557 square miles
Main stem length: 168 miles
Tributaries: Milk, Poplar, Redwater, Big Muddy Creek
Cities/towns: Fort Peck, Poplar, Havre, Glasgow, Wolf Point
Access: U.S. 2, Montana 24 and 200

The lower Missouri River drainage is a land of badlands and fossils...of breaks and coulees...of rolling farmland and windswept plains dotted with glacial potholes that capture snow melt and serve as oases for cattle and wildlife. Here, at the western limit of the northern Great Plains, the Sweetgrass Hills, Bearpaws, and Little Rockies rise like islands from a sea of grass. As it winds toward North Dakota, the Missouri River is impounded for 135 miles behind Fort Peck Dam in the fourth largest freshwater reservoir in the world. From its re-entry into Montana northwest of Havre to its confluence with the Missouri below Fort Peck, the sluggish, turbid Milk River meanders for 658 miles. Lifeblood of the prairie, the Milk provides irrigation for the crops and hayfields of communities like Chinook, Dodson, Malta, and Tampico, located along its shady banks.

The Missouri River once occupied what is now the Milk

MIKE ADERHOLD

The Milk River (left), which provides irrigation for crops and hayfields along most of its meandering course, empties into the Missouri (above) downstream from Fort Peck Reservoir. The western hognose snake (below), a curious inhabitant of this region, turns belly up and "plays dead" when disturbed.

MIKE ADERHOLD

GLENN MEIER

The lower Missouri drainage supports several rare fish, including the paddlefish (above) and the pallid sturgeon (the larger fish in the photo below, shown next to a shovelnose sturgeon).

DAVE CASTLEBERRY

River Valley, until the ice sheets pushing south from Canada caused the river to shift south and cut its present channel. Another pre-glacial channel indicates that the Missouri River once flowed northeast into Hudson Bay. Such evidence of continental glaciation is part of this region's unique geology. The dry, shaly badlands surrounding Fort Peck Reservoir are thought to hold an abundance of fossils. Hell Creek National Natural Landmark is noted for its variety of fossils, including *Tyrannosaurus rex* and the oldest true alligator, *Brachychampsa fontana*.

Ample opportunities for solitude on prairie rivers with "prehistoric" fisheries and unique wildlife values may be the lower Missouri River drainage's biggest recreational draw. The Milk River contains some of the least explored water in Montana. Use was heavy on only 15% of the river miles assessed in the drainage. Rivers with lower use are still important recreational resources because they have their own distinct values and help to keep some of the pressure off more popular streams. Canoeing, boat fishing, hunting, picnicking, and camping were primary or secondary uses on as much as a third of the river mileage, but as with most Montana rivers, fishing from shore was by far the top recreational use, occurring as a primary or secondary activity on 80% of the river miles.

Fifty-three fish species were identified in the Missouri River below Fort Peck Dam, including the rare paddlefish, pallid sturgeon, and shortnose gar, large prehistoric relics once common throughout the Missouri/Mississippi River system. They are Class A species of special concern (limited numbers both in Montana and elsewhere in North America) and their presence earned the 168 miles of the Missouri River below Fort Peck and the lower 100 miles of the Milk River Class I in the fisheries final resource value, the second highest number of Class I miles of any drainage in the state. Another 477 miles on the Redwater, Poplar, and Milk rivers were rated Class II in the final resource value because they are important local fisheries with high species diversity, or because they provide spawning habitat to Missouri main stem fisheries.

Montana has two of the six remaining populations of paddlefish in North America which have become genetically isolated in areas between dams. One population resides above Fort Peck Dam and the other inhabits and/or spawns in the Missouri and Yellowstone rivers between the dam and Garrison Dam in North Dakota. Dredge cuts, formed during construction of Fort Peck Dam, provide year-round habitat for paddlefish, which can weigh more than 100 pounds and are either snagged or harvested with bow and arrow. Montana is at

the upper limit of the remaining range for shortnose gar, another large river fish that inhabits the dredge cuts. The historic population status of the pallid sturgeon is unknown in Montana, but its numbers have dwindled throughout its downstream range. The rainbow trout below Fort Peck, a self-sustaining strain of spring spawners adapted to conditions below the dam, are long-lived and grow rapidly. Fluctuating water levels during reproductive stages are apparently limiting numbers. The DFWP is working with the Army Corps of Engineers on possible mitigation, but the Corps also is considering an increased power production plan that calls for construction of a reregulating dam that would flood the dredge cuts and destroy this unique fishery.

While fishing was the most common recreation overall in the lower Missouri River drainage, hunting was noted as a primary or secondary activity on a third of the river miles. The north-side tributaries to Fort Peck Reservoir earned the most game species points of any wildlife unit in the drainage because they support excellent populations of mule deer, pronghorn, elk, bighorn sheep, prairie grouse, and pheasants.

Fort Peck Dam, which took 10 years to fill, inundated nearly a quarter of a million acres of Missouri River floodplain and breaks. Creation in 1936 of the Fort Peck Game Range on a million acres of surrounding abandoned "dust bowl" lands helped to mitigate the habitat loss for some species, but due to inundation of most of the region's well-developed riparian habitat, over three-quarters of the habitat ratings in 17 wildlife units fell into Class IV. Notable exceptions were two reaches between Fort Peck Dam and the North Dakota border, which received Class II and III ratings. The Big Muddy Creek drainage, which includes Medicine Lake National Wildlife Refuge, received a substantial species value because it has been used as a stopover for endangered whooping cranes on their annual migration.

Thirty-five wildlife units were assessed on the expansive Milk River drainage and several on the main stem earned high habitat and species values, including the Class I stretch from Fresno Reservoir to People's Creek near Dodson. Little Cottonwood Creek is home for the western hognose, a robust prairie snake with a keeled, shovel-shaped snout used for burrowing in loose gravels. Found along streams and on dry prairies, the hognose preys on amphibians and other reptiles. When disturbed, the hognose turns belly up, writhes vigorously, and then lies still, mouth open and tongue lolling. Certainly, this creature is the lower Missouri River drainage's most curious inhabitant.

CHRISTOPHER CAUBLE

The Yellowstone cutthroat trout, admired here by two generations of Montana anglers, has inhabited the region for nearly 75,000 years.

Upper Yellowstone River Drainage

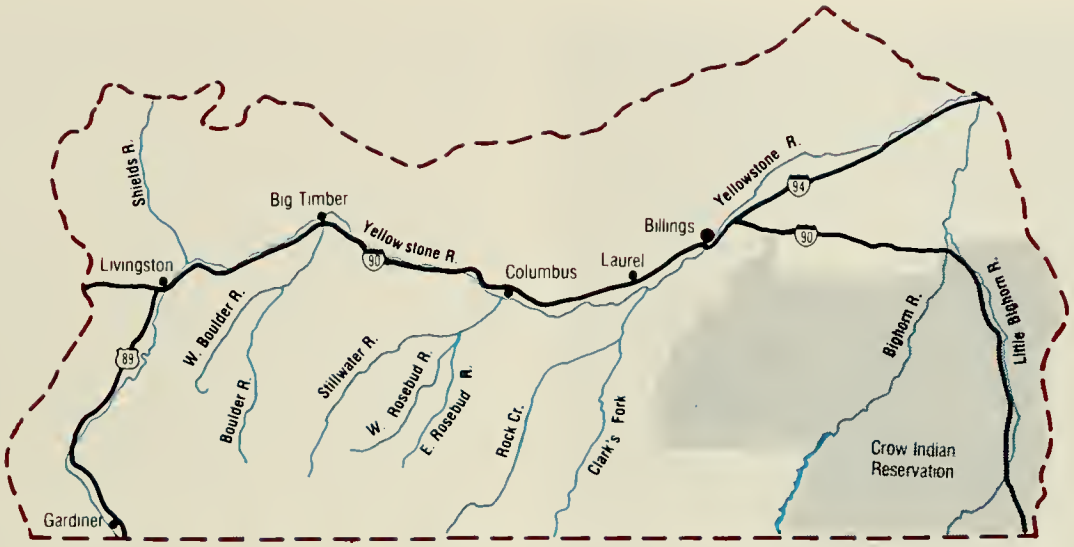
Boundaries: headwaters to Bighorn River
Drainage size: 12,840 square miles
Main stem length: 262 miles (in Montana)
Tributaries: Boulder, Shields, Clark's Fork, Stillwater, Bighorn
Cities/towns: Gardiner, Livingston, Big Timber, Columbus, Laurel, Billings
Access: Montana 89, Interstate 90 and 94

From a sparkling mountain stream high in Yellowstone National Park to a major prairie waterway, the sinuous Yellowstone River is the longest free-flowing river in the contiguous 48 states. In order to deliver four trillion gallons of water to the Missouri each year, the Yellowstone gathers power in its upper section from tributaries that rise in the Bridger, Crazy, Pryor, Absaroka, and Beartooth mountains. Often called the "roof" of Montana, the Beartooth Plateau boasts 29 summits higher than 12,000 feet. Thousands of feet below them, the undulating prairie stretches north and east as far as the eye can see.

Water is prized on the dry plains, so it's no surprise that in the 1970s, the Yellowstone River and its tributaries were under siege as debates were staged over conflicting river uses such as hydropower, coal development, and recreation. The Montana Legislature clamped a moratorium on all Yellowstone water projects until water rights issues could be resolved. In a landmark case, the Montana Board of Natural Resources in 1978 approved instream reservations for fish and wildlife resources on the Yellowstone main stem and tributaries. Plans for greatly expanded development of the Fort Union Coal formation were shelved. The precedent for considering fish and wildlife concerns had been set.

The Yellowstone's free-flowing nature explains why it is so highly valued as a recreational resource. Whitewater enthusiasts find plenty of adventure in the perky rapids immediately below Gardiner and the more challenging Yankee Jim Canyon a few miles farther downstream. Kayakers are drawn to the turbulent Boulder and Stillwater rivers. The upper Yellowstone River drainage contains 20 of the 100 inventoried miles of moderate to major rapids in the state. Considering that 1,760 miles in the drainage was assessed for recreational value, it's clear that whitewater boating is a minor use of the river—compared with shore fishing, which once again came out on top, taking place as a primary activity on 68 of the 90 inventoried segments.

Two nationally renowned spring creeks, Armstrong and



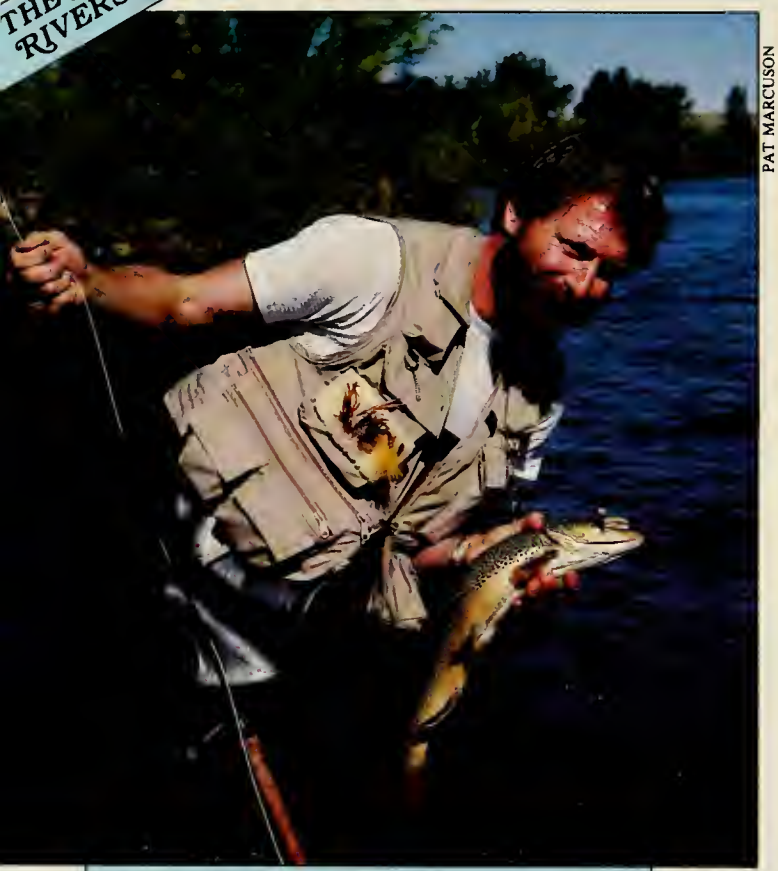
RICHARD MOUSEL

RODNEY SCHLECHT

GEORGE WUERTHNER

The pristine beauty of the Yellowstone's Paradise Valley (above) attracts tourists from all over the world. The Stillwater River (left) appeals to kayakers as well as fishermen. The upper Yellowstone and its tributaries supply important habitat for nesting bald eagles, waterfowl, and great blue herons (far left).

Nelson, helped to earn 40 miles of the upper Yellowstone River drainage Class I fisheries in the habitat and species value. The majority of the other Class I reaches earning this value provided essential spawning habitat to the main stem. Surprisingly, only one reach, on Crooked Creek in the Pryor Mountains, received a Class I rating due to the presence of pure Yellowstone cutthroat trout. This native species reached Montana nearly 75,000 years ago from the upper Snake River via what is now Two Ocean Pass in the southeastern corner of Yellowstone National Park. Water flowing into the saddle from the north splits into two channels and flows into the Snake River on the west slope of the Continental Divide and into the Yellowstone River on the east. The cutthroat thus extended its range into all tributary streams east to the Tongue River, where Lewis and Clark reported catching 800 in a few days. Fishing pressure and increased water and land use



PAT MARCUSON

The Bighorn River below Yellowtail Dam is a trout fishery of national importance, containing as many as 10,000 trout per mile.

steadily decreased cutthroat populations throughout their range until, by the 1950s, they inhabited mostly upper river tributaries in headwater areas. Genetic analysis of populations in 27 streams in the upper river drainage since 1986 revealed 17 streams contain pure populations, but have not yet been included into the fishery data base.

The upper and lower Yellowstone each contained 128 miles of Class I sport fisheries, the largest number in the state. Yellowstone cutthroat and numerous brown and rainbow trout, the pristine beauty of the Paradise Valley, and good access all contributed to the Class I value in 99 miles of the Yellowstone River from the park boundary to the Boulder River—the longest "blue ribbon" trout stream in Montana. Recent data indicate trophy-sized cutthroat are declining in the main stem and dewatering of tributaries is diminishing their spawning habitat.

As the Yellowstone River moves downstream, its sport fishery value declines to a Class II in the 74 miles from the Boulder River to its convergence with the Clark's Fork, and then to a Class III in the 81 miles to the mouth of the Bighorn River, due to increased turbidity and warming temperatures. Aesthetics are important in determining both fishery and recreational values, and while scenic quality was rated outstanding or substantial on 40% of the upper Yellowstone River drainage miles, it was rated only moderate on 45%. Tributaries receiving a substantial sport fishery value included the entire Stillwater River and reaches of Rock Creek and the Boulder River. The Shields River, the only major northern tributary, was a Class III sport fishery throughout its length due to few trout and low fishing pressure.

The Bighorn River is a trout fishery of national importance and an outstanding wildlife area. Thirty-one miles immediately below Yellowtail Dam is a Class I sport fishery containing as many as 10,000 trout per mile, half of them 15 to 18 inches long. The Bighorn earned one of only two Class I wildlife final resource values in the upper Yellowstone River drainage.

Substantial wildlife values are associated with the riparian zones found along the eight Yellowstone main stem units and tributaries. Important resting areas for migrating waterfowl and nesting for herons and Canada geese more than compensated for extensive development along the river. Nearly half the main stem and tributary units are used by nesting and/or wintering bald eagles. Nine historic peregrine eyries are located on the main stem and tributaries, and the Yellowstone River is home to snapping and spiny softshell turtles, reptiles of special concern, which prefer quiet backwater areas. The wildlife unit that comprises East and West Rosebud creeks in the upper Stillwater River is one of only four units statewide harboring high densities of at least seven big game species.

Because of the startling contrast between prairies and Montana's highest peaks, the upper Yellowstone River Basin contains a respectable percentage of the state's Class I and II geologic sites. The Beartooth Highway crosses the Beartooth Plateau in plain view of hanging valleys, cirques, tarns, horns, and other evidence of intense glacial action. The rugged limestone Lost Water Canyon, a 1,630-acre area in the southeastern corner of the Pryor Mountains, is a proposed Forest Service Research Natural Area, a candidate for National Natural Landmark, and a Class I natural feature. This pristine forested canyon is the easternmost extension of Douglas-fir in Montana. The Pryor Mountains also contain a large number of limestone caves covered with ice and calcite crystals, including Mystery Cave, which has been locked to prevent vandalism of its stalactites, flow stone, and soda straws. These are but a few of the reasons that this diverse, rugged region is botanically and geologically significant.

Lower Yellowstone River Drainage

Boundaries: Bighorn River to North Dakota border
Drainage size: 69,103 square miles
Main stem length: 270 miles
Tributaries: Powder, Tongue, O'Fallon Creek
Cities/towns: Forsyth, Miles City, Glendive, Sidney
Access: Interstate 94

French explorers called it the "Roche Jaune," meaning "yellow rock," a fitting name for the wide, tree-lined river as it meanders through spectacular yellow bluffs and rimrocks on its journey to North Dakota. In comparison with the relatively flat, glaciated plains to the north, south central Montana is a country of plateaus, wind-carved sandstone "hoodoos," and eroded gumbo badlands. By the time the Yellowstone River reaches the mouth of the Bighorn River about 50 miles northeast of Billings, its transformation from a crystalline mountain stream into a mighty plains river is complete. From there it continues to gather strength, and sediment, from major tributaries like the Powder and Tongue rivers. This change of

character naturally affects the river's fisheries, wildlife, and recreational use.

Scenery of the lower Yellowstone River country appeals to a smaller cross section of users than does the mountainous country to the west. Those who find great beauty in the rugged plains would probably argue with the Montana Rivers Study recreation assessment, which did not assign Class I scenic value to any segments, and only rated 10% of them Class II. Recreational use was rated moderate to heavy on less than a third of the river miles, and low on 43%. These figures were consistent with low levels of access. None of the segments was rated as outstanding for recreation in general, but it's important to note that the recreation assessment assigned a Class I rating to only the best 10% of river segments in the state.

The angler can never complain about lack of variety in the lower Yellowstone. Fifteen-inch sauger are common, burbot weigh up to 10 pounds, channel catfish provide 25% of the catch, and a snag fishery exists for paddlefish. Other species are walleye, shovelnose sturgeon, northern pike, and smallmouth bass. A total of 1,448 stream miles in 114 reaches was assessed for fishery value. Three reaches in a 214-mile stretch of the Yellowstone main stem from Forsyth to the state line received a Class I habitat and species rating because they provide substantial habitat for paddlefish and pallid sturgeon, and limited to moderate habitat for the pearl dace and sturgeon chub, minnow species of special concern.

The presence of paddlefish from Garrison Reservoir in North Dakota coming upriver to spawn contributed to a Class I sport fishery in two reaches totaling 128 miles between the mouth of the Powder River and the state line. A diversion dam at Intake concentrates the fish below the dam. Since 1972, a creel census at Intake has revealed an estimated annual harvest of 2,000 to 5,000 paddlefish with a mean weight of nearly 44 pounds. Two reaches of the main stem between the Bighorn and Powder rivers contributed 141 miles of Class II sport

WADE FREDENBERG

Fishermen along the lower Yellowstone are tempted by channel catfish (above), sauger, burbot, paddlefish, shovelnose sturgeon, walleye, northern pike, and smallmouth bass. The lush cottonwood forests, wetlands, and backwater sloughs along the Yellowstone between the Bighorn and Tongue rivers support nesting herons, high numbers of raptors, and both spiny softshell and snapping turtles (below).

MIKE ADERHOLD

DAVE BOOKS

STEVE WIRT

The lower 87 miles of the Tongue River (below) supports exceptional habitat for many wildlife species, including Canada geese (above). The Powder River (top) has a good smallmouth bass fishery and provides spawning habitat for Yellowstone River sauger, catfish, and shovelnose sturgeon.

KRISTI DUBOIS

fisheries. The lower ratings resulted from less fishing pressure, a lack of abundant paddlefish in these reaches, and a lower aesthetics rating.

Community importance and high species diversity earned another 17 reaches in 551 miles a Class II fisheries rating—including the Powder River, O'Fallon Creek, and most of the Tongue River. The Tongue and Powder rivers have good resident fisheries for smallmouth bass, and they provide spawning habitat for main stem sauger, catfish, and shovelnose sturgeon.

The green and lush Yellowstone main stem from the Bighorn to the Tongue River is one of the best examples of a braided prairie river in the state, and because it is undammed, it may be one of the last remaining examples of a naturally flooding river system in the lower 48 states. Periodic scouring and flooding stimulates the germination of cottonwood trees, and deposits nutrient-rich, silty alluvial soil in which seedlings become established. Cottonwood forests, abundant wetlands, backwater sloughs, and islands support nesting and wintering bald eagles, nesting herons, high densities of breeding raptors, and both spiny softshell and snapping turtles. This section of river scored the maximum number of wildlife habitat quality points and the most game and furbearer points of any of the 26 wildlife units in the lower Yellowstone River drainage. The remaining 150 miles of the lower Yellowstone, except for the section between the Tongue and Powder rivers, also earned Class I habitat ratings and Class II or III species values. In a significant step to protect this dynamic river system, the DFWP has acquired three management areas totaling 2,150 acres along the main stem.

Exceptional riparian habitat doesn't stop with the Yellowstone main stem. The meandering lower 87 miles of the Tongue River also achieved Class I habitat rating, and portions of the upper Tongue River earned outstanding species value for support of the plains hognose and milk snakes, great blue herons, golden eagles, and other raptors. It's apparent that the lower Yellowstone River drainage's wildlife habitat, species numbers, and diversity stand up well when compared with mountainous western Montana.

* * * * *

Montana's remaining free-flowing rivers provide values that cannot be duplicated or replaced. We can still boast of native westslope cutthroat trout, wild trout fisheries, and angling opportunities for paddlefish; breeding harlequin ducks and playful river otters; whitewater rapids, and other water-based recreation. We can also reflect on the changes on the Kootenai, the Missouri, and the Flathead, where the free-flowing nature of those rivers was interrupted. Some of the changes were beneficial; others were not. It comes down to a question of balance—balancing conservation of remaining river values with other uses. We cannot create more free-flowing rivers. But we can act on the information provided through the Montana Rivers Study to conserve some of the last of what is best in Montana and deserving of our salute: the rivers.■

READERS RESPOND

In Search of Smallmouth

I lived eight wonderful years out West. Most of my visiting and fishing was done in Montana. I expect to retire in a few years, and I'll be moving to Montana as soon as possible. I'll do some fishing and wildlife photography, so I enjoy the articles and pictures in your *Montana Outdoors*.

I notice that more and more smallmouth bass are being introduced into Montana. Was it native to Montana at one time? Smallmouth bass is my favorite fish, with the brown trout a close second. Would it be too much trouble to send me a run-down of smallmouth bass waters in Montana?—*William A. Stephenson; Alexandria, Virginia*

• *Smallmouth bass fishing in Montana is growing in popularity. Opportunities are limited primarily by the availability of hatchery fish. Smallmouth are not native to Montana. They were first introduced in Horseshoe Lake near Bigfork and have since been introduced in several areas around the state. Fishable populations of smallmouth bass are currently found in the Tongue River, Tongue River Reservoir, Yellowstone River downstream of the Tongue River, Fort Peck Reservoir, Warm Springs Creek near Lewistown, and Noxon and Cabinet Gorge reservoirs in western Montana. In addition, several isolated lakes across the state contain smallmouth populations.*

Department of Fish, Wildlife and Parks fisheries managers would like to enhance smallmouth populations and even expand their range, but smallmouth fingerlings are a precious commodity. Most of the northern states find it difficult to produce smallmouth bass in hatcheries because unpredictable spring weather often drives spawners off their nests before the eggs hatch. The new, state-of-the-art warm-water fish hatchery being constructed at Miles City may enable DFWP managers to stabilize conditions. The hatchery will include facilities to heat and cool water as necessary. In addition, hatchery personnel will experiment with artificial nests that can be moved to indoor facilities after the eggs are deposited.

If the innovations at Miles City are successful in reducing annual fluctuations in success, DFWP managers will have a stable supply of fingerlings with which to improve smallmouth bass fishing. Top priority is currently assigned to establishing a new population of smallmouth in the lower Bighorn River and enhancing the existing populations in Noxon and Cabinet Gorge reservoirs.—Steve McMullin, Management Bureau Chief, Fisheries Division

Flathead Biggest—WEST of Minnesota

I like your magazine.

On page 23 of the May/June issue, mention is made of Flathead Lake as "the largest natural freshwater lake west of the Mississippi." Similar mention is on page 38.

Page 521 of the "1988 World Almanac" lists the nation's largest natural lakes. West of the Mississippi is Minnesota's upper and lower Red Lake, covering 451 square miles. Water is fresh. Herb Watts of the Havre Daily News some years ago corrected me. By the way, I've seen Red Lake, and it's not much for scenery. So I refer to Flathead Lake as the largest natural, freshwater lake west of Minnesota. A few years ago Tahoe was considered a bit larger, but not now. —*Mel Ruder; Columbia Falls*

Beautiful to Behold

You have outdone yourselves with the Jan./Feb. 1988 Special Photo Issue. It is a joy to behold. Other states like Illinois and Washington could certainly take a lesson from you.

Thank you for a beautiful issue. —*Mrs. Tobi Van Dyck; Chicago, Illinois*

Regional Forester John Mumma (left), Trout Unlimited's Bill Cain (center), and Department of Fish, Wildlife and Parks Director Jim Flynn sign a hallmark agreement that is good news for trout. The agreement will help protect and enhance trout habitat within 10 national forests in Montana (DFWP photo: Tom Warren).

Habitat For The Future

continued from page 12

acknowledges that the willing seller will determine the manner by which such interest is obtained and thus provides for all three alternatives.

It is intended that the rules will address policy considerations for making acquisitions generally, as well as establish procedures for determining in each case of a proposed acquisition whether the interest will be acquired.

It is intended that the commission identify habitat needs by administrative region and compile these needs in a consolidated statewide habitat acquisition plan. The rule must ensure that acquired interests in habitat lands are reasonably distributed around the state in accordance with the statewide habitat acquisition plan and that emphasis is placed upon those areas where important habitat is seriously threatened.

It is intended that the department exercise good land management practices on all land acquired, and multiple uses of such land, when not detrimental to its value as wildlife habitat, are specifically authorized. The department shall identify management objectives for each proposed acquisition, analyze potential impacts to adjacent private land resulting from those objectives, and develop plans to address such impacts.

A public hearing must be held in the area of each proposed acquisition, after the required analysis has been completed by the department, for the purpose of obtaining comment from the interested public. The analysis and related public concerns are to be presented to the Fish and Game Commission prior to its final action on any acquisition of interest and also to the Board of Land Commissioners if that body is required to make a decision on the proposal.

The policy and analysis for each proposal acted upon in a biennium must be presented to the members of both the House and Senate Fish and Game Committees when they next meet in regular session.

In addition to the assurances provided in the statement of intent under which HB 526 was passed, additional concern among farmers, ranchers, and other agricultural interests was relieved by highlighting how the department has managed its WMAs to date.

Erickson explains that department-owned management areas are currently managed primarily for the benefit of wildlife. This approach will continue, where appropriate, on lands secured in the future. "As on other lands managed under the department's present philosophy," he says, "livestock grazing, timber harvest, recreation, and other uses, as deemed suitable, will be permitted and integrated into the management of wildlife areas secured in the future."

According to Erickson, the fact that the department makes payments in lieu of taxes to the counties in which its properties are located also helped to ease some concerns. "And because 20% of the funds available each year will be set aside for development and maintenance of these areas, including the control of noxious weeds," he says, "the land will be properly cared for."

The rules drawn up and adopted by the Fish and Game Commission not only outline the manner by which lands will be secured, but also establish a policy for such actions. This policy provides for a comprehensive analysis of:

(1) the wildlife populations and use currently associated with the property;

(2) the potential value of the land for protection, preservation, and propagation of wildlife;

(3) management goals proposed for the land and wildlife populations, and where feasible, any additional uses of the land such as livestock grazing or timber harvest;

(4) any potential impacts to adjacent private land resulting from proposed management goals and plans to address such impacts;

(5) a land maintenance program to control weeds and maintain roads and fences; and

(6) any other matter considered necessary or appropriate by the commission.

This policy, aired in draft form at a series of public hearings throughout Montana during February, also sets specific guidelines that the DFWP must follow when assessing all potential acquisitions under the new law. The guidelines are:

(1) The department will develop and adopt a plan for acquisition of an interest in wildlife habitat that will be revised at least every three years. Emphasis in this plan will be those areas where important habitat is seriously threatened. The plan will assure that interests acquired in lands will be reasonably distributed around the state. The plan will require comprehensive analysis of the criteria in HB 526, as listed above.

(2) When a parcel of land is identified as a priority for acquisition according to criteria in the habitat acquisition plan, management objectives for the parcel will be the primary determinant for the type of acquisition to be sought. If management objectives can be met by acquisition of a lease or easement and agreement can be reached, then these options will be the first pursued. If agreement cannot be reached or if management objectives cannot be met by these options, then the acquisition of fee title will be pursued.

(3) Following initial negotiations on the property, but before any final action, the department will identify management objectives for the proposed action and develop a preliminary management plan. This management plan will be prepared according to a standardized format adopted by the department and will include an

analysis of the potential impacts to adjacent private land and proposed methods to address such impacts.

(4) After completion of the preliminary management plan, a public hearing will be conducted in at least one community near the proposed acquisition. Before the hearing, the proposed acquisition and management plan will be sent to local sportsman's clubs, county commissioners, adjacent landowners, and other interested parties.

(5) The preliminary management plan and related public concerns will be presented to the Fish and Game Commission before its final action on any acquisition, and to the Board of Land Commissioners if that body is required (by law) to make a decision on the proposal.

(6) If the Fish and Game Commission approves the acquisition and the Board of Land Commissioners concurs, the department will prepare a final management plan for the area for commission approval. This plan will address, if appropriate, noxious weed control, compliance with federal aid regulations, if necessary, and Montana Environmental Policy Act (MEPA) compliance for significant management activities. It will also contain a plan for monitoring and evaluating the results of the land management activities.

The DFWP has established long-range plans for securing additional land for wildlife in the state and it presently is setting priorities for implementing the commission's rules to assume management control of new areas in the future. Money provided through passage of HB 526 is the catalyst that will spur this process into high gear.

Yet, as important as these newly acquired funds for wildlife habitat may be, perhaps of equal importance is the lesson in cooperation for the common good that the passage of HB 526 has taught. Says DFWP Director Jim Flynn: "This bill brought together the state's agricultural community, the Montana Wildlife Federation, sportsman's clubs, private conservation organizations, and the department for the benefit of the state's wildlife, and in this sense it was truly notable.

"Several concerns were brought out in the public process to which House Bill 526 was exposed," Flynn continued, "and these were worked out in the legislative process. As a result, we view HB 526 as an example of what other states might do to generate those funds needed to secure more areas for the benefit of wildlife."

Echoes the Montana Wildlife Federation's Schoonen: "Cooperation in the interest of wildlife—cooperating for the benefit of wildlife and Montanans as a whole—that's what the passage of HB 526 was really about. And learning that cooperation is possible and can work is perhaps just as important as the funds for new habitat this bill will provide." ■

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BOOK REVIEWS

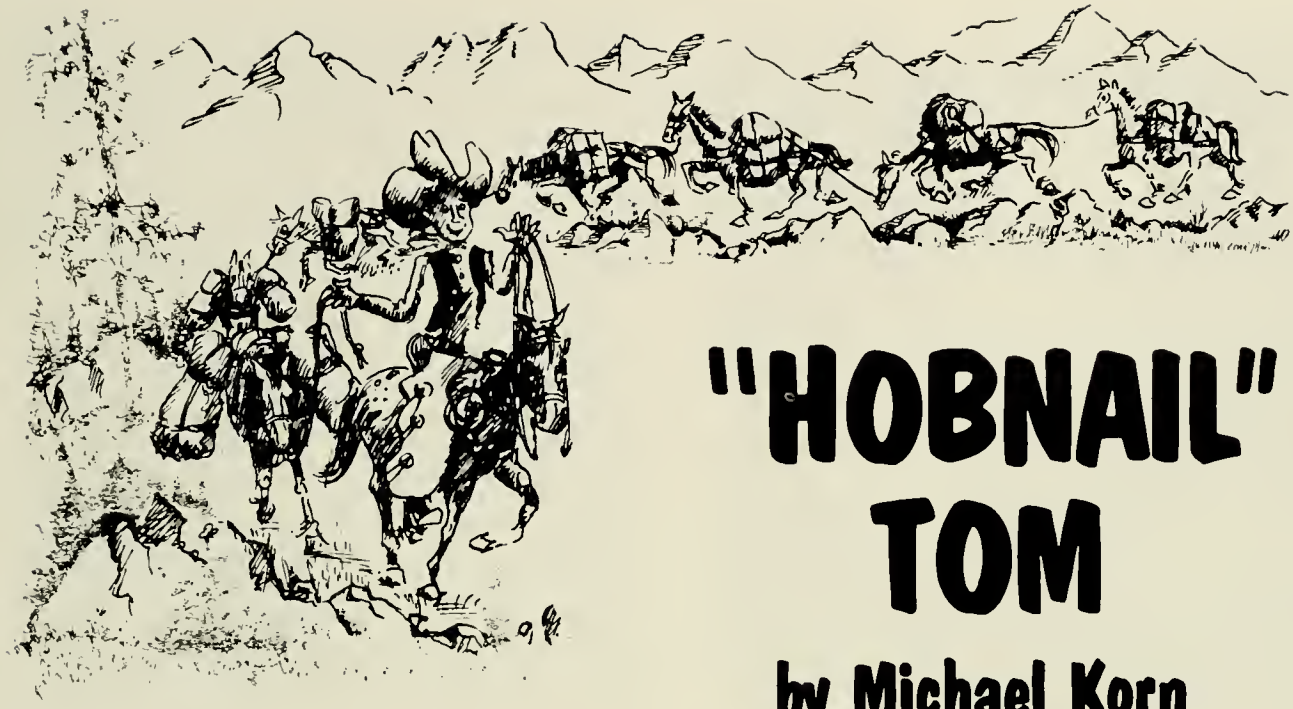
MONTANA ON MY MIND, photography by Michael S. Sample and Larry Mayer, Falcon Press Publishing Company, P.O. Box 1718, Helena, MT 59624; 120 pages, 212 color photos, $29.50 hard cover.

I'm not sure about the purpose of "coffee table" books—decoration, conversation piece, or perhaps a method of impressing guests with oversized, expensive books. So, here comes another: "Montana on my Mind." It's oversized, not inexpensive, but the purpose—ah, yes, it may well be to remind us why we choose to live in Montana.

Tastefully designed, the book is a collection of outstanding photography (encompassing not only the scenic and wildlife, but also folks of this state) set against an off-gray background and interspersed with quotes (not too many) from notable Montanans, such as Mike Mansfield, Charles M. Russell, A.B. Guthrie, Jr., to name a few.

But back to why we choose this Big Sky country to call home. For most of us, the essence of Montana is at our fingertips—a rainbow carpet of spring wildflowers, silk prairie grasslands laid over by a gentle breeze, a newborn colt discovering his wobbly legs—just a matter of a few minutes to a few hours from our doorsteps. Some of the photographs called up for me sweet memories of the warmth and beauty of sunlight tiptoeing across snowy mountaintops and the wonderment of trumpeter swans with translucent wings stretched high to pull them up off the water and into flight. These discoveries, so much a part of Montana, should be etched into our memories and added to each day of our lives. It makes for rich living. As Charlie Russell put it, "...the camp you live in now can bost of man made things but your old hom is still the real out doors and when it comes to making the beautiful ma nature has man beat all ways from the ace and that old lady still owns a lot of montana...."

"Montana on my Mind." It's a good investment for the coffee table, but a better one for the soul. *—Donita Sexton, art director*



"HOBNAIL" TOM

by Michael Korn

There are few things that give me more pleasure than to go into the backcountry at the earliest possible moment in the spring. Game has just pushed back with the receding snow from the low country, streams are high, and whitewater is everywhere. True, the trails are plugged with the downfall that inevitably comes in the spring, but with a jolly crew along and sharp double-bitted axes and trailwise cayuses it takes a tough barrier to stop us. But this high water business, of course, makes crossings impossible at places—then you go over the top and follow your nose.

"The Scapegoat in May"
from the The Whitetail Tattler

When "Hobnail" Tom Edwards and his wife, Helen, started packing dudes into the Lincoln backcountry in 1947, the area around the Whitetail Ranch was still remote. It wasn't the easy automobile drive from Missoula, Helena, or Great Falls it is today. A narrow, bone-jarring dirt (or mud) road that was frequented by large, speeding logging trucks was the Highway 20 (now 200) of the time. You had to *want* to go there to get there. The country along the North Fork of the Blackfoot River offered some of the best fishing and hunting in Montana. This wild and scenic place had been the haunt of Indians, miners, traders, and sheepherders of the late 19th century. It was also a gateway to the Bob Marshall Wilderness.

Tom Edwards taught science and art at Helena High School. He had started the Whitetail in 1938 and spent weekends and vacations there. More than one of his students lent somewhat willing hands to get and keep the place in shape. Ask anyone who had Tom for a teacher in the '40s and '50s, and they'll likely remember "weekends" at the Whitetail with a wry smile. Come Friday afternoon, Tom would tell students, "The fishin's great at the ranch! Why don't you come up this weekend?" Tom Sawyer himself couldn't have dreamed up a more tempting or self-serving invitation. Students would drive the dirt roads from Helena to Avon and through Helmville to the Whitetail, whereupon Tom exchanged their fishing gear for a hammer and a box of fence staples and pointed them to the nearest sagging barbed wire. Tom eventually developed quite a reputation for his ability to cajole almost anything out of almost anyone. According to Howard Copenhaver, Tom's partner in the Whitetail for many years, "...Tom could sell an Eskimo a deep freeze." Yet, people willingly came and helped. Tag Rittel, dude rancher and outfitter from Wolf Creek, was one of Edwards' students during the early years and credits Tom with inspiring him to get into the dude business. Outfitters Smoke Elser of Missoula and Jack Hooker, who worked at the Whitetail, both credit Tom with teaching them the ropes. Helena artist Bob Morgan, too, put in his time on the Whitetail as a result of taking art classes from Tom—a relationship Bob has never regretted.

The two things that meant the most to Tom Edwards were people and the backcountry. He found a way to put the two together at the Whitetail. Up in the backcountry at Meadow Creek, Tom did a little "rearranging" on some beaver dams to raise the level of the lake, considerably enhancing the trout fishing there. By setting up a big "kitchen" tent and some smaller sleeping tents, Edwards put in a summer camp for his dudes and proclaimed it to be the best digs in the backcountry. Hooker remembers that Tom used limbs and crooks for hat racks and almost anything else he could find at the campsite to make it a bit more "deluxe." From the Meadow Creek camp, Tom took guests farther into the backcountry to see elk, mountain goats, and, at times, bears, in the Lincoln-Scapegoat country and the Bob Marshall Wilderness. Tom wanted to make people's experiences in the backcountry fun, but he also wanted them to learn about the country. During the ride, Tom pointed out and identified plants and trees as well as historical

sites. In a word, Tom was their host.

Edwards did not fit the image of big, burly backcountry outfitter. In fact, he probably didn't tip the scales at more than 130 pounds dripping wet with his chaps on. Nor was he tall. The night before a trip, Tom would scurry around the corrals, dragging an apple crate from place to place. To load his pack stock, he'd throw the crate on the ground and climb on top so he could reach high enough to throw a sling around a mantied load.

Tom, along with a group he "invited" from Helena, restored the Cooney Creek (also known as Carmichael) Cabin so hunters from the ranch could use it in the fall. Harry Joslin was one of those Helenans who helped Tom fix up the cabin:

> We put in a wood floor, and then packed in windows, a stove, and built bunk beds. We put in a hell of a lot of work to get 'er back into shape. When we came back a week later, the place was just a wreck! A big ol' grizzly had gotten in there. The ol' bear got his claws on the end of a log outside the cabin and just yanked it and a few others clear out of plumb. Then, he either figured that wouldn't work or just plain got mad so he crashed in through the window. After he'd clawed his way in, he took a look at the stove and you could almost imagine that ol' bear standin' there sizin' it up. And then he just let loose and busted it one! Soot, stovepipe, and busted nuts and bolts were all over the cabin. When he finished with that, he apparently decided to leave and in doing so made the door that was supposed to open in, open out. We found it about 15 feet from the cabin!

Tom used a good bit of backwoods ingenuity to make successful hunts for his guests, and his knowledge of elk anatomy led to an "invention," according to Joslin:

> Tom reasoned that an elk's trachea was about three inches around and it occurred to him that it was like a piece of radiator hose. So Tom went down to the auto supply and got himself some radiator hose about three feet long. He ran a piece of twine through it, tied it off for a sling, and that was his elk bugle. Tom had a pretty high-pitched voice, and he would haul back and roar through this thing, and it sounded absolutely nothing like an elk! But damned if the elk wouldn't come stampeding off the mountain at him. Everyone just hoo-rahed the hell out of Tom for runnin' 'round the hills with this chunk of radiator hose 'round his neck and scarin' the elk but damn, it worked!

When it came to guiding dudes in the backcountry, Tom and

ROLAND FISHER COLLECTION

Tom and Helen Edwards (inset) operated the Whitetail Ranch for more than 30 years, introducing hundreds of people to wonders of the Bob Marshall Wilderness and the Lincoln-Scapegoat country.

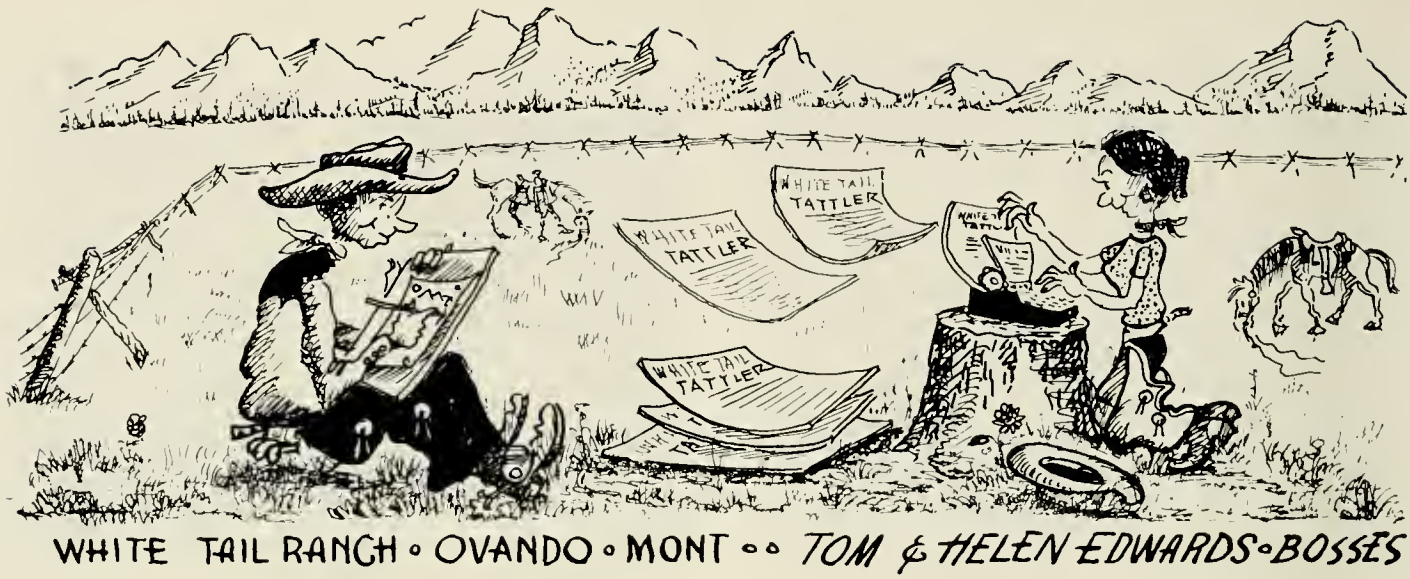
MONTANA HISTORICAL SOCIETY, HELENA

his crew rose to the occasion. He respected his guests because they were sportsmen and wanted to learn about the country while they hunted. There were, however, exceptions to the rule. Tom's former guide and packer, Roland Fisher of Clancy, recounted:

> Tom loved to tell a story about a fellow and a grizzly. Before he even left home, this fella got with the local newspaper and bragged on how he was going out to Montana to shoot grizzly. So he arrives out here and he's packin' this old Winchester .348 Model 71 carbine.
>
> Tom was a great strategist when it came to hunting. No matter if you had one or a hundred elk—you'd surround 'em. So Tom was up Cooney Creek getting the horses, and he looks up to the head of the creek and there's this herd of 20-25 head of elk. Tom runs back to the cabin and immediately organizes the hunt for the next day.
>
> Day comes and it's snowin' like mad. As the hunters leave, this fella asks Helen if she had an extra dishtowel so he could cover the action of his gun—he didn't want to get it wet. According to Tom, if you'd seen that gun, it looked like the guy'd been driving railroad spikes with it and now, after years, decided to take some care with his rifle.
>
> So they go up Cooney Creek and sure enough, there were elk there. Tom Raymond, another guide, paired up with this guy and so here they are, runnin' around in these tunnels in this limber pine with elk pussy-footin' their way 'round in there, too. Suddenly, they hear some rustling. The hunter yells, "I heard sumthin," and Tom says, "Well, be quiet!" About this time some kind of animal comes up and this guy has his gun all wrapped up with his hand inside the dishrag. Hell, he couldn't get off a second shot if he needed to 'cause the lever was all bound up in the rag. Suddenly, there's a KERBANG! and the guy yells, "I got one! I got one!" and Tom says, "Okay, but be quiet, there might be more in here!" After a few minutes Tom walks over to see the "elk" and up and screams, "—- ——, a ——- grizzly!" Well, Tom walks over to the bear and kinda pokes at him. He finally says, "It's okay, he's dead," and they spend the rest of their time packin' the poor ol' bruin back to camp.
>
> Ol' Tom was just furious that this guy just up and shot without even knowing what it was he was shooting at. We rode into camp the next day and he was still stewing over it. He was just beside himself that the guy was so careless and stupid. What was worse is the guy got in touch with the Helena Independent on his way out of Montana and they did an article on him. By all accounts, it was the hunter who should've gone out of that country in a canvas bag, not the bear!

There was a good bit of the promoter in Tom. In fact, some acquaintances think his nickname, "Hobnail," was his own idea rather than a handle given him by others. When asked, Tom told guests he got his name as a lad when he wore hobnail boots into his mother's kitchen. A similar story says that Tom's moniker was born when he walked through the kitchen of the Whitetail absent-mindedly wearing his hobnails and Helen threw a wall-eyed fit because he tore up her floor. Whichever account may be "the truth," the handle—and the

A FULL MOON COMES OVER RED MOUNTAIN... ..YOU KNOW HOW THE GLOW COMES FIRST, THEN THOSE LONE PINES ON THE SKYLINE TAKE FORM LIKE INDIANS AROUND A BLAZING CAMP FIRE. ..AND YOUR DARK, BLACK VALLEY BEGINS TO LIGHT UP WITH THAT EERIE, SILVERY, GOLDEN LIGHT...AND IN THE HUSH OF THIS BACK COUNTRY YOU FEEL HIS PRESENCE EVERYWHERE.



mystique—stuck. Incidentally, Helen's nickname was "Pancake," supposedly because she was the cook, and again it's hard to tell whether it was a product of an incident or of Tom's imagination.

One of the genuinely noteworthy of Tom's "promotions" was a newsletter he sent out every year from the ranch, The Whitetail Tattler. In The Tattler, Tom wrote about the year's adventures and the guests who joined him in the backcountry. He wrote in an old-fashioned, almost affected "western" style similar to that used by Bob Fletcher on the historic road signs across Montana. A sample of Tom's writing comes from his description of the Whitetail and the services provided:

> We bust a ham string tryin' to have good eats and clean beds. We cater to you who seek essential comforts but want to enjoy mountain livin' about as far from Times Square or the Loop as you can git. It takes on the average 'bout two days for your high tension nervous system to start unwinding and your new Levis to get baggy at the knees. The two wrinkles between your eyes gits shallow and the tight grip of your mouth muscles lets go along about supper time the second day.

Along with such homespun prose, Tom drew cartoons, illustrations, and caricatures. While in camp, Tom often found a flat spot and doodled with a pencil or even a piece of charcoal. His results always impressed the guests. Beyond the Whitetail, the Montana Outfitters and Guides Association (of which Edwards was a founding member) used his maps and illustrations for their brochures. A bouncing, loppy string of horses carrying flopping dudes became one of his many signatures.

Yet, there was a serious side to Tom's writing and his life, too, that fit right in with his love for people and the backcountry. In the early 1950s, the Forest Service made plans to bring the North Fork country closer to "civilization." It proposed cutting roads and building car campsites in many parts of the Scapegoat. For almost 20 years, a bitter and historic fight was waged to get congressional designation of the Lincoln-Scapegoat as wilderness. When the wilderness bill was finally signed into law, the Scapegoat became the *first* strictly citizen-initiated wilderness proposal enacted in the nation after passage of the 1964 Wilderness Act.

Edwards joined with Lincoln resident Cecil Garland and others to fight for the Scapegoat. The passionate testimony and meeting notes of the Scapegoat debate eerily foreshadowed arguments over wilderness designation in other parts of Montana heard today. The Scapegoat players were similar—energy, mining, and lumber interests; conservationists, outfitters, and recreationists.

Howard Copenhaver has said that Tom's ability as an orator was second to none: "When old Tom gave a speech at some meeting, you could hear a pin drop. He was a botanist and speaker supreme...." That ability with words came in very handy when Tom and others from the Lincoln-Scapegoat country appeared before Congress to argue for wilderness. In 1969, Tom told a congressional committee about his love for the backcountry. Paraphrasing the words of Eli W. Laird, who started a dude ranch at Lindbergh Lake in the 1920s, Edwards spoke of the quality of the backcountry—what both Laird and he called "The Hush":

> Into this land of spiritual strength I have been privileged to guide on horseback literally thousands of people—the

MILO McLEOD

OVER THIS TRAIL FOR MORE THAN THIRTY YEARS, TOM EDWARDS (1889–1975) FOUNDER OF WHITETAIL RANCH, OUTFITTER, TEACHER, ARTIST, NATURALIST AND CHAMPION OF WILDERNESS, LED MANY HUNDREDS OF PEOPLE INTO THE WILD COUNTRY THAT WAS HIS PASSION, INTRODUCING THEM TO ITS BEAUTY, MYSTERY AND POWER. HOSBAK TOM SEIZED EACH MOMENT IN THE MOUNTAINS AND MADE IT FOR OTHERS A LIFETIME GIFT.
LOLO National Forest

On September 8, 1978, a group of Tom Edwards' friends gathered near the North Fork trailhead to dedicate a trail named in his honor.

old, many past 70, the young, the poor, the rich, the great, and little people like myself. I have harvested a self-sustaining natural resource of the forest of vast importance. No one word will suffice to explain this resource, but let us call it the "hush" of the land. This hush is infinitely more valuable to me than money or my business.

The Forest Service-proposed roads in this fragile land may satisfy the clamor of the masses but the hush of the land that the masses really seek will be crushed forever....The group who really uses this resource and pays the bill is the public, the people the outfitter takes into the area. And what are these people buying? Is it fishing and hunting? Not for the most part. I would have gone broke years ago if this had been the case. As I have said before, most come to this country to buy the "hush of the land...."

I know well the plan of the Forest Service. I have read it and discussed it with its authors and proponents. They sincerely feel that small islands of wilderness can be kept unsullied and undamaged. But how can we stand on that great Scapegoat Mountain looking down at its foot at bulldozers, trucks, and cars at the head of the Dry Fork, Cabin Creek, and Tobacco Valley, listening to the hideous noises of modern devices, and trying to kid ourselves that we are enjoying the wilderness and partaking of its goodness.

With all my being I urge you—don't let this majestic land down—don't let beer cans and human filth that inevitably comes with a road lay waste to so priceless a heritage of our great nation.

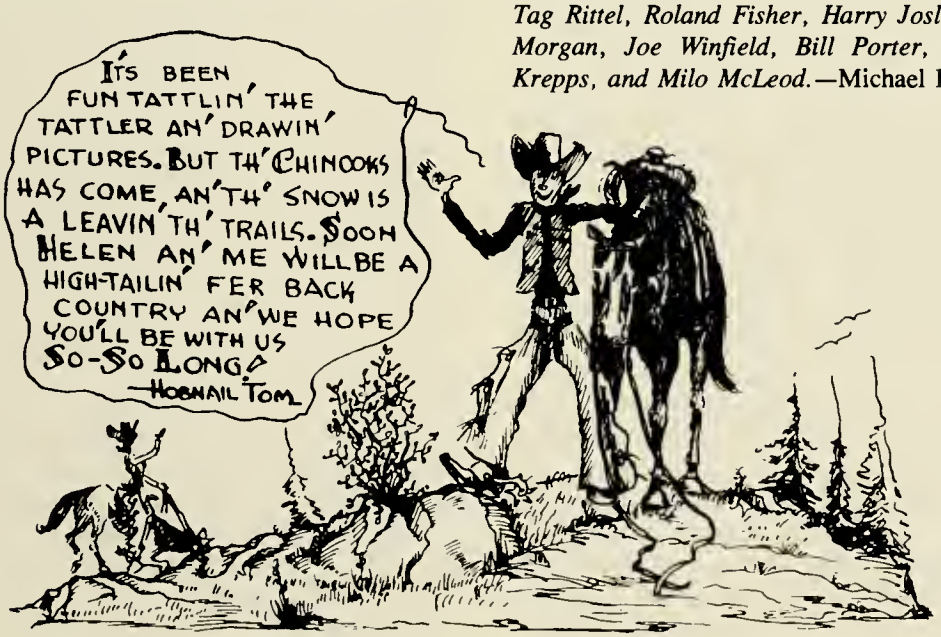
Edwards pulled out all the stops and called upon the many people he had guided into the Scapegoat over the years to help with cards, letters, and telegrams. That, and the unfailing work of Cecil Garland, the Montana congressional delegation, the then Montana Department of Fish and Game, and many other individuals across the country finally led to designation of the Scapegoat as wilderness in 1972. The vote came at a time Congress was struggling with debate over Vietnam. Yet amidst that roaring tempest, there was time to make the Lincoln-Scapegoat an official wilderness—strong testimony to the national importance of that backcountry.

Helen "Pancake" Edwards died in 1970. Tom sold the Whitetail to Jack Hooker, long-time Whitetail packer and guide, and retired from the business. He remarried and he and his wife, Judy, lived on the east side of Kleinschmidt Flat only a few miles from the Whitetail and close to the North Fork of the Blackfoot. He and Judy traveled, and Tom spoke and wrote. The last two years of his life, Tom kept a diary. Like The Tattler, Tom's diaries are funny and profusely illustrated. Even at 76, Tom hadn't lost his gift for humor or drawing. Tom died in Helena in 1975.

On September 8, 1978, a group of people gathered about a quarter of a mile from the North Fork trailhead. There, they formally dedicated a sign naming the trail that leads along the river to Cooney Creek Cabin and the Danaher. The route assumed the name of the man who had taken so many people into the backcountry and helped to preserve one portion of Montana backcountry: "Hobnail" Tom.

By today's standards of sportsmanship and backcountry use, Tom's (and others') use of the resources of the Scapegoat would send a chill down a wilderness ranger's back. Pack trips of 40-60 dudes and almost a hundred head of stock definitely were *not* "light on the land"; surrounding and shooting up elk herds was done with little thought toward the resources of tomorrow. Grizzlies were often taken indiscriminately when the opportunity presented itself. But in some ways, it's unfair to judge the conservation ethics of those times with what we have come to believe and embrace today. And for his time, Tom Edwards' ideas on wilderness and conservation were years ahead of most. Today, we reap the harvest of the seeds Tom Edwards began sowing over 40 years ago.■

• *Special thanks to the following folks who helped put together this article: Verner and Judy Bertelsen, Jack Hooker, Margaret and Howard Copenhaver, Smoke and Thelma Elser, Tag Rittel, Roland Fisher, Harry Joslin, Gayle Joslin, Bob Morgan, Joe Winfield, Bill Porter, Martin Brauns, Bob Krepps, and Milo McLeod.*—Michael Korn


IT'S BEEN FUN TATTLIN' THE TATTLER AN' DRAWIN' PICTURES. BUT TH' CHINOOKS HAS COME, AN' TH' SNOW IS A LEAVIN TH' TRAILS. SOON HELEN AN' ME WILLBE A HIGH-TAILIN' FER BACK COUNTRY AN' WE HOPE YOU'LL BE WITH US SO-SO LONG
—HOBNAIL TOM

Muskrat

When schools choose a name for their athletic teams, they tend to select animals with obvious qualities of strength or endurance. Names like the "Eagles," "Lions," "Bison," or "Grizzlies" are popular. But appearances can be deceiving, because in the game of survival, one of the toughest animals of all is the modest muskrat.

At under four pounds, the muskrat is a lightweight in the physique department, but when it comes to coping with natural and manmade changes in the environment, the muskrat is an all-star. From the outskirts of New York City to the outback of Alaska, muskrats thrive.

Besides food, about all the muskrat needs is water. It isn't too particular whether the source is a lake, reservoir, stock pond, river, creek, or even a water hazard on the local golf course. Although muskrats prefer swamps, they do quite well in any body of semifresh water that affords enough depth (as little as one foot) for them to escape their enemies.

The muskrat, *Ondatra zibethicus*, is also known as musquash or marsh hare; like other members of the Order Rodentia, such as the porcupine, prairie dog, squirrel, mouse, marmot, and beaver, it has a conspicuous matching pair of amber-colored upper and lower incisors. Like most rodents, the muskrat has five toes on each foot. The front feet serve as "hands" when the muskrat feeds, while the back feet, which are much larger and have fleshy webs between the toes, provide a strong stroke for swimming. The muskrat's tail, its rudder, is half an inch wide, 10 to 12 inches long, and composed of hard, fleshy scales. Although it appears bare, the tail is lightly covered with brown hairs and often tipped with white hairs. From nose to tip of tail, the muskrat's body is 22 to 24 inches long.

Soft, glossy hair that varies from dark brown to cinnamon covers the muskrat's body. Beneath the hair is grayish underfur. The hair repels moisture and keeps the muskrat dry, even underwater; the underfur thickens in the colder months to keep the muskrat warm. The beautiful coat and luxuriant fur are the muskrat's claim to fame. Annually, trappers take thousands of muskrats in Montana and millions nationwide, making it the kingpin of the fur industry. Among trappers, it may be more prestigious to trap coyotes, mink, or beavers, but the muskrat is the steadiest source of income.

Introduced by fur entrepreneurs to Europe in the late 1800s, muskrats soon became a serious nuisance. Their habit of digging tunnels wreaked havoc with the dikes and canals of Holland, Belgium, and Germany. Muskrats still persist in Europe, and trappers receive a bounty on the animals they catch, besides a price for the fur itself.

Because muskrats are accomplished tunnelers (they can excavate a bankside home in anything short of concrete or solid rock), those living along rivers and streams generally live in bank dens. A favorite site is between the roots of a bankside bush or tree where overhanging foliage provides cover for the muskrat's comings and goings. If there are no banks for tunneling, muskrats build dome-shaped houses of reeds and grass, plastered together with mud. These houses

are located offshore so the dwellings are completely surrounded by water. The best place to spot a muskrat house is among reeds or cattails in the shallow end of a pond where the house is anchored to plants, rocks, or submerged logs. A typical muskrat house is two feet high, but some reach surprising proportions—as much as five feet high with a base 15 feet in circumference. Muskrats excavate an inner sleeping chamber and at least two "drop holes" that provide access to the water beneath the house. Whether it's a house or a bank den, muskrat homes always have at least two drop holes. Should a mink enter one hole, the muskrat has another for escape. Muskrats also reside in abandoned beaver lodges.

Muskrats eat a variety of aquatic vegetation such as cattails, bulrushes, and sedges, and they will also venture onto land for almost anything green. They have a special love for corn. During winter, they dine on hibernating snails, crayfish, or frogs that they dig from the mud.

During most Montana winters, the muskrat's pond, marsh, or stream will be covered by ice. From its bank den or house, the muskrat has access to the water—and its food supply—beneath the ice. Although it can stay submerged for up to 10

for Mascot

HARRY ENGELS

by Mark Bennett

PAT BENNETT

The muskrat's front feet serve as "hands" while it feeds on aquatic vegetation such as cattails, bulrushes, or sedges. Muskrat houses (above), built of reeds and grass plastered together with mud, are typically about two feet high.

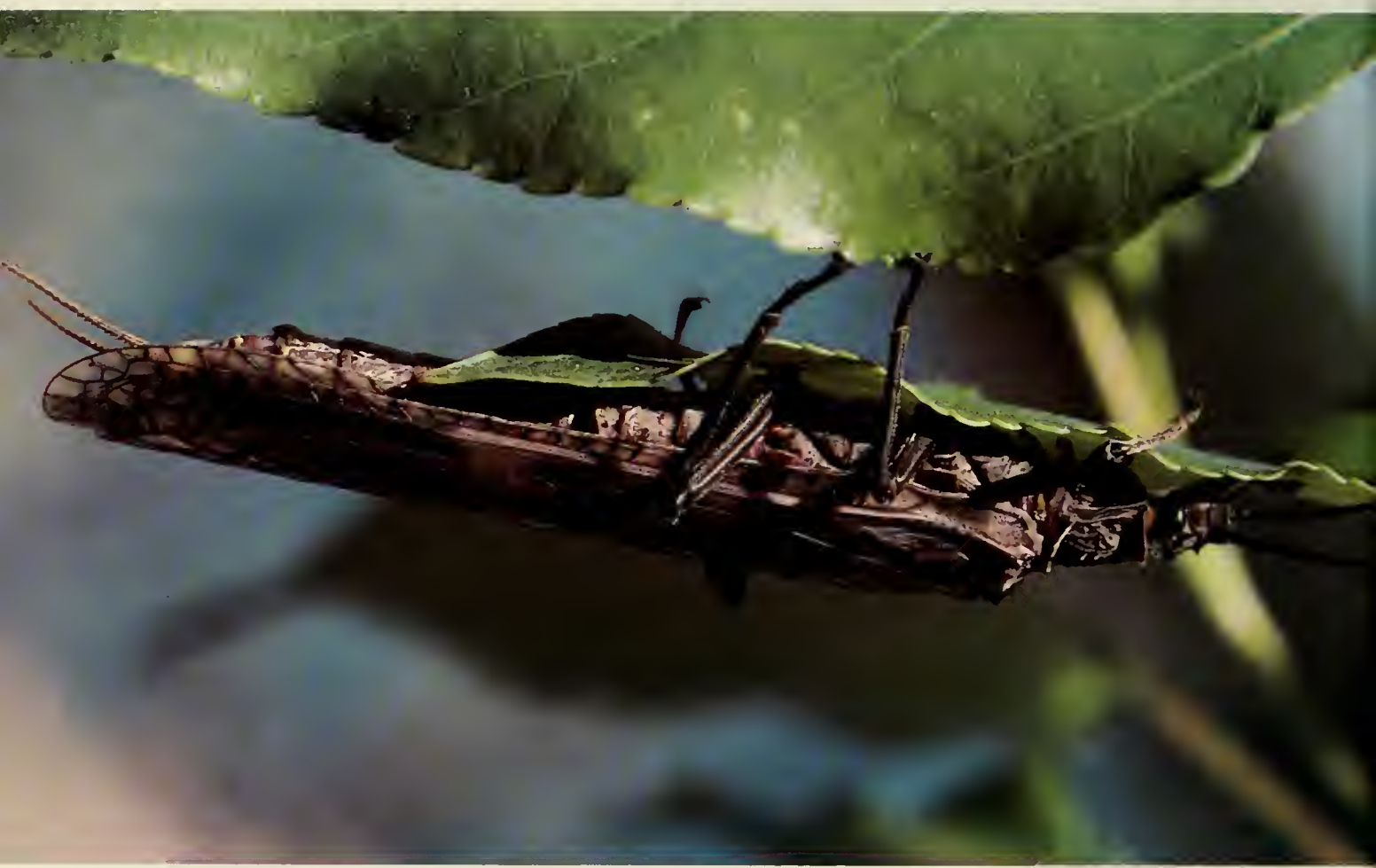
minutes, the little rodent has evolved other adaptations to aid in winter survival. While the ice is still thin, the muskrat breaks a hole in the ice, brings grass up from the pond or stream bottom, and builds an insulating cover called a "push-up" around the hole to prevent re-freezing. The push-up provides a breathing and resting spot for the animal in its under-ice travels. The feed bed, another muskrat construction project, resembles a muskrat house, although it is generally flatter. The feed bed has an interior chamber where the muskrat eats food gathered underwater. A flap of skin that closes behind the teeth enables the muskrat to bite off pieces of food underwater, but it must bring the food above water to swallow.

A host of predators, such as hawks, owls, mink, coyotes, weasels, and raccoons, take their toll on muskrats throughout most of the year; but during freeze-up, the muskrat is safe from all of them, including the mink. Thick ice hinders human predators as well, and most muskrats are trapped in fall and spring, before and after freeze-up. Although cold weather brings respite from predators, in an extremely cold winter, a pond or marsh may freeze to the bottom, killing the muskrats living there.

Despite trapping, predation, and the ravages of floods and droughts, muskrats are as plentiful as ever. In a typical year, a female will bear three litters during the warm months (up to five litters if there is an early spring and late winter), with an average of six kits per litter. Although mortality is high among young muskrats, and the life expectancy around four years for an adult, it doesn't take long for muskrats to replenish or even overpopulate an area. Muskrats are gregarious, but there is a limit to the population level that they (especially males) will tolerate. Vicious fights commonly occur in spring and summer as muskrats establish territorial rights. These battles disperse younger muskrats into new areas and keep established areas balanced with healthy populations.

The next time you're out fishing, hiking, or driving a back road near water, look for muskrats. You can see them any time of day, but the best times are just after sunrise or just before sunset. Although they may not be as popular as elk, deer, or bears, muskrats are still fascinating. They may not be any school's mascot, but since hardiness is a quality worth emulating, perhaps they should be.■

FESTIVA



The glow of sunrise was just beginning to cast vivid images in the cottonwood bottom. Water lapped the willows as the river's myriad bird life awakened.

The evening before, long, tough legs grasped slick boulders and exposed tree roots. The final journey of the nymph had begun. With tenacious effort, the salmonfly nymph moved upward into the cool, green grass. He was hidden now, and slowly worked his way to the old cottonwood which had stood vigil over the mighty river for more than 100 years.

The aged bark was pitted and cracked, creating footholds and hiding places, and the nymph soon found a safe, secure home for the night. A restless breeze whispered through the leaves of the cottonwood, and the nymph slowly changed color as the wetness from the river evaporated to the sky. Soon, metamorphosis began. The nymph struggled within his shell as the veined wings inside began to expand. In the deep of the

L!

by Ron Marcoux

DAVE BOOKS

night, the shell cracked, and with tremendous effort an adult salmonfly emerged from the "skin" that had allowed the nymph to survive the harsh variations of four years in the turbulent river.

The birds, spotting the discarded shell cases in the early morning light, began to intensify their calls. The new adult salmonfly felt the warmth of the morning sun. His ruffled wings began to unfold and reflected the sun's rays. His back was dark brown and his belly bright orange—the color of a salmon egg, and hence his name.

Other male salmonflies began to move through the twisted willow branches, seeking mates. Moving quickly, the newborn male salmonfly also began the treacherous journey to find a mate. Unstable at first, and using the strength of many legs, he crawled upward into the patterned leaves. Near the top of a willow overhanging the river, he found a lone female. Clutching her desperately, he fertilized the thousands of microscopic eggs she had been producing through the night. Another transformation took place—life beginning anew. The spent male retreated, his calling completed.

As the morning slowly unfolded, the birds' excitement increased. Young in nests moved about with mouths agape, waiting for the first meal of the day. Mothers sitting high in the trees awaited the annual festival of the river. The moment had come; with a quiet flutter of his majestic, shining wings, the male salmonfly began his flight into the sky. A second later, a western kingbird dived toward the surface of the river and, pulling upward with a quick opening of her beak, caught the salmonfly and returned to her offspring. The festival had begun. More salmonflies began to fly; some escaped, but it was a time of feasting and life for the abundant songbirds along the river.

The female salmonfly held her position on the limb, and slowly eggs began to extrude, accumulating in a large mass at the tip of her abdomen. She, too, had attained her calling after the years spent in the river.

One step remained. She stretched her wings and raised up to the sky. A swooping bird missed on its attack, and the female retreated to the swirling surface of the river. She splashed hard on the surface and began to flutter her wings, moving with the twisting currents. As water engulfed the egg mass, it began to weaken; the eggs soon broke free and drifted to the river bottom.

The splash alerted a wary brown trout, now 8 years old and weighing over four pounds. He was nearly full, since he had gorged himself on drifting nymphs that had not yet made the climb ashore. But the activity on the surface deserved attention, and with a flick of his tail he moved to investigate. Drifting toward him were fluttering wings and an elongated silhouette with an orange glow. The tiny egg specks drifting by went unnoticed. Slowly he moved closer to the drifting, fluttering insect, and with a quiet slurp forever stilled the beating wings. It was festival time.

Two days later, along this stretch of the big river, the festival was over. Birds sang quietly, their young content. The big brown lay under the old brush pile, gilling slowly, his belly stretched with the last few adults that had floated by. Below in the rocks, thousands of tiny eggs began to develop. In time, the young would imitate their parents, and seek refuge among the large cobbles in the riffles.

Each year, the cycle is renewed. It is a time for meeting the call of life, transformation, death, and rebirth. It is a time of expectation, natural beauty, excitement, and fulfillment. It is a time to be preserved forever.■

Landowners and Sportsmen

TOWARD A PARTNERSHIP

by Rich Clough
illustrated by Lavon Horne

When talk turns to landowner/sportsman relations, you often hear a lot about what has led to ill feelings—cutting fences, driving across seeded fields, trespassing, poaching, illegal posting of federal lands. Rarely does talk turn to actual problem solving and promotion of good relations.

That, however, is the goal of the Department of Fish, Wildlife and Parks' two-year old Landowner/Sportsman Relations Program. We need to remember which actions hamper or even destroy positive relations, but it is more important for us to find ways to eliminate or minimize those actions.

With two-thirds of Montana privately owned, the program has pushed for recognition of the vital role private landowners play in outdoor recreation. We have tried to emphasize safety and ethics through hunter education and informational pamphlets; we have tried to increase respect for private landowner rights through trespass legislation, the "Ask First" campaign, brochures, and other efforts; we have offered assistance in managing hunters by giving out free signs and permission booklets. These efforts have helped foster better relations and have become ongoing parts of the overall Landowner/Sportsman Relations Program. But we also recognize that additional efforts are necessary because of the growing number of recreationists and the changing agricultural economy.

Since the 1970s, the recreation scene on Montana's private lands has been changing. The increasing number of hunters has strained the tolerance of many farmers and ranchers; many landowners have also found that leasing hunting rights is a way to add to their income. Fee hunting has also emerged as a way of dealing with recreational demands, while resulting in money in the bank.

Yet, the trend from free access to fee (or leased) access is not operating in a vacuum. Examination of its long-term effects on recreation prompted a statewide Montana Landowner/Sportsman Conference in April 1986. Approximately 130 people from all parts of the state attended the conference. About half of them were landowners and the other half were recreationists. They came prepared to address issues and make recommendations defining the future of recreational access in Montana. Although access and fee hunting were the catalysts for this meeting, these issues soon were relegated to symptoms of other concerns. Landowners, faced with economic uncertainty, expressed frustration with providing recreational access; time lost and potential costs associated with public use of their lands outweighed benefits.

During the conference, discussions and debates centered on landowner compensation, liability, increased penalties for trespass and game violations, and hunter ethics. In keeping with the "problem-solving" emphasis of the meeting, the idea of forming local landowner/sportsman committees to

help solve their own problems was discussed. A steering committee continues to meet in an effort to implement some of the solutions. Another such conference was conducted in Lewistown in February where the importance of direct communication was again emphasized.

Montana landowners and sportsmen are not separated by an insurmountable gap. Most residents of the state are here because of a unique lifestyle that includes appreciation of the wildlife, the land it inhabits, and recreational opportunities.

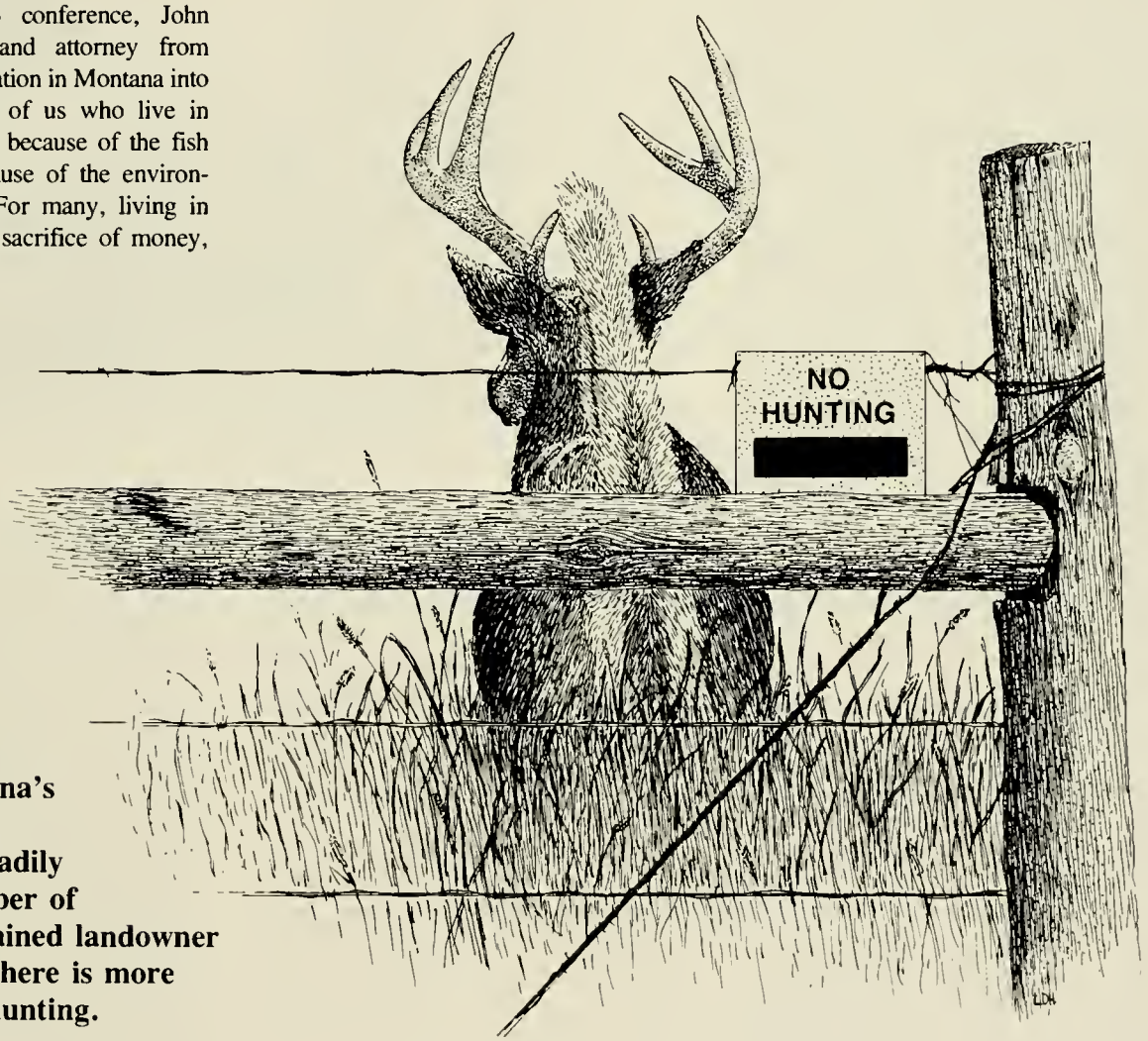
During the 1986 conference, John Flynn, a rancher and attorney from Townsend, put recreation in Montana into perspective: "Many of us who live in Montana do so only because of the fish and game, and because of the environment they occupy. For many, living in Montana means the sacrifice of money, career, and personal choices. Thus, when one tampers with the fish and wildlife, one tampers with the very foundations of existence for many Montanans."

Outdoor recreation is growing. Think of how difficult it is during the peak summer season to find a camping spot in Yellowstone or Glacier. How many would-be campers are turned away on the Fourth of July? Now imagine a Montana landowner just before, on, and after the opening day of hunting season. Landowners experience a virtual onslaught, however well-meaning, of sportsmen seeking access. So, the department is trying to assist landowners willing to continue providing public access in managing the recreationists seeking access to their land.

Perhaps the most widespread complaint received from landowners is that work hours are lost during the critical fall harvest and cattle shipping season. Providing access for sportsmen has become a complicated chore once easily handled with a tip of the hat. The hunter was usually a neighbor or long-time friend. But now the pressure for access has grown across state lines, not just property lines. The rancher loses time answering letters, telephone calls, and the door.

Two methods have been used to address the landowner's dilemma. First, for three years, the department has piloted a formal hunter-management program. The department offers to hire someone to administer hunting on the property of a landowner who is willing to continue allowing public access. In some cases, interested landowners may join forces, and the parcels involved are administered by the person the department hires. The person hired establishes a check-in point at which he or she:

- grants permission to hunt;
- provides maps;
- provides specific information regarding the access points; and
- provides the rules for hunting on the private property.



The recreation scene on Montana's private lands is changing. A steadily increasing number of hunters has strained landowner tolerance, and there is more talk about fee hunting.

He or she is also charged with dispersing hunters over the property, patrolling the area, and collecting harvest information for the department's wildlife biologists. Depending on hunter pressure, some landowners may need someone seven days a week, while others may require help only on weekends. In some cases, the DFWP hires the landowner, his spouse, or a ranch employee. This can be cost effective if the land is far from town. In other cases, the landowner is compensated not with money, but with posts and fencing for building haystack enclosures. This method of payment not only retains free access, but also relieves potential damage problems to the haystacks by deer and elk.

The department has not aggressively advertised the hunter management program because of limited funds and the potential for having to turn hunters away if too many descend on one particular area. Staff at regional department offices attempt to evenly distribute hunters to the available areas.

In a program such as this, landowner liability becomes a question. The department's legal opinion is that the landowner and the department are protected to the greatest extent possible under the law because reimbursements are for providing hunter management, not cash or lease payment. Liability would become an issue only in cases of injury to a person or property for an act or omission by the landowner that constitutes willful or wanton misconduct.

The second access program involves establishment of "cooperative walk-in-only areas." Usually, several landowners are involved, including state and federal land management agencies, as well as private landowners.

In the walk-in-only program, the department provides materials, such as cattle guards, fence posts, wire, and gates to establish parking areas. During the hunting season, department personnel put up signs and patrol the areas. In some areas, the Fish and Game Commission has adopted special regulations designed to make enforcement easier for game wardens.

In walk-in-only areas, permission to hunt is automatically implied and some of the areas provide recreational access

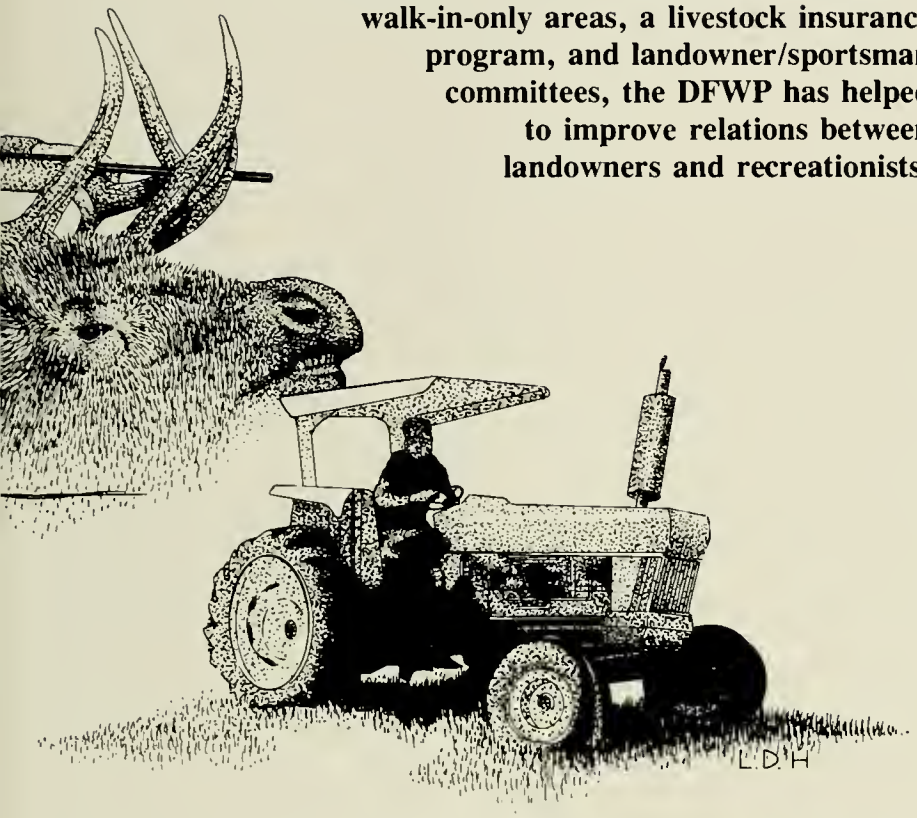
to land not previously accessible. The department recognizes the problems walk-in areas present to some sportsmen. Those unable to walk, for example, have limited opportunity. Efforts will continue to retain or seek areas these sportsmen can utilize. However, in several cases, walk-in areas have made the difference between no access and free access.

Walk-in-only areas, almost by definition, are more cost effective than managing hunters in more formal ways. After parking areas are established, walk-in administrative costs are minimal. We spent approximately $5,000 on the walk-in program last year; it provided access to about 600,000 acres.

The formal hunter-management program cost approximately $50,000 to operate the past season and involved more than 1.1 million acres. Combining the two programs, we expended less than a nickel an acre to keep open *nearly 1.7 million acres of land for sportsmen* in 1987. The pilot programs have received good reviews, but funding restrictions will prevent statewide expansion in the near future. The department has committed $115,000 to the 1988 program, which should allow a noticeable expansion this fall.

We are also piloting a Livestock Insurance Program. This option is automatically available free to landowners participating in either the hunter management or walk-in programs. During 1987, landowners in DFWP administrative Regions 3 and 7 (Bozeman and Miles City) could also participate if they applied for coverage and allowed reasonable free public access. These two regions were included in the 1987 program to assess administrative costs and actual loss pay-out requirements, since actuarial data is unavailable. If livestock is killed or injured by hunters, the landowner files a claim with the department. The payment schedule used for reimbursement is based on a tax assessment value established by the Montana Department of Revenue. The

By establishing a hunter management program, walk-in-only areas, a livestock insurance program, and landowner/sportsman committees, the DFWP has helped to improve relations between landowners and recreationists.



amounts do not reflect 100% of market value, but still offer some relief at no cost to the landowner.

The Department of Livestock investigates reported losses. Only four payments have been made in two years, and the program coverage may be expanded statewide in the near future.

Another innovative approach to landowner/sportsman relations has been establishment of several local landowner/sportsman committees. Each committee has from eight to 12 members, with landowners and sportsmen equally represented. We try for a cross section of interests—for example, the owner of a large ranch, a landowner in a subdivision, a grain farmer, a tree farmer, an archer, a muzzleloader, a rifle hunter, and perhaps a non-hunter. Landowners may allow free access or be involved in fee access operations or outfitting, or they may have decided not to permit recreational activities on their land. Members are selected from recommendations made by organized landowner and sportsman's groups in the area, and from regional department personnel.

The department's landowner-sportsman relations coordinator supplied these participants with problem-solving techniques and information about issues of local concern. These groups have the potential of finding new approaches to resolving the many issues facing recreation.

A committee's goal is to create direct communication between various interests, including the department, and encourage cooperative problem solving at the local level. The department provides assistance to the committee on request, but only to the extent the committee wants. All but one of the committees has asked the department to send a representative to each meeting, and they generally ask area biologists and wardens to participate.

Committee members are encouraged to share their ideas and the minutes of their meetings with the "special-interest" groups they represent.

To some degree, this approach offers a forum for cooperative game management. In 1931, in "Game Survey of the North Central States," Aldo Leopold advocated this approach in one of his seven recommended actions for a game policy: "...In short, make game management a partnership enterprise to which the landholder, the sportsman, and the public each contribute appropriate services, and from which each derive appropriate rewards."

Department proposals, such as tentative regulations, can be presented to these groups before public hearings. Committee members' comments and recommendations may be used to identify potential issues, and assist in making the public meeting process more effective.

Montana's Landowner/Sportsman Relations Program committees are relatively new and, although it may be premature to draw any conclusions, initial results have been rewarding. The concept is receiving broad support from landowner and recreational groups and several issues have been favorably resolved.

Any communication link established in a spirit of cooperation between landowners, sportsmen, and the department will benefit the future of recreation in our state. And any ideas that promote landowner/sportsman relations are always welcome. Good or bad relations depend on how the participants see their rewards from the relationship when measured against their contributions. Maintaining a balance is the purpose of the Landowner/Sportsman Relations Program and by achieving this balance, we hope to protect the many recreational opportunities on Montana's private lands.

Montana still has the option to solve problems. With cooperation, a "partnership" attitude, and hard work, landowners, sportsmen, and the department can come up with a range of solutions where everyone can benefit. ■

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